Journal

of the American Association of Nurse Anesthetists

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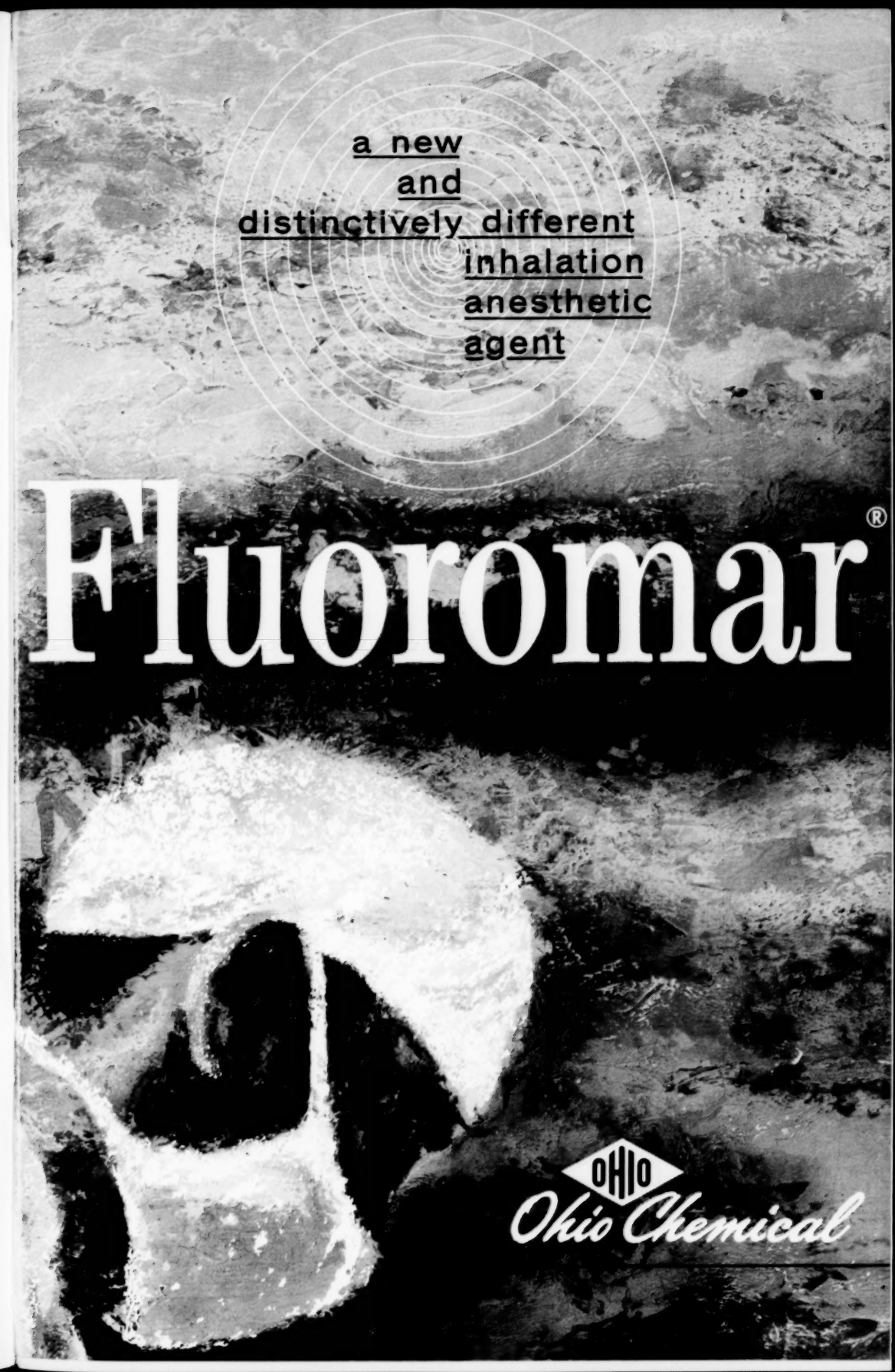
The Journal of the American Association of Nurse Anesthetists is published bi-monthly by the American Association of Nurse Anesthetists, 130 E. Randolph St., Chicago 1, Ill. Entered as second class matter, May 14, 1945, at the post office at Chicago, Ill., under the act of March 3, 1879. Address all communications relative to editorial and advertising matters to the Editor, A.A.N.A., 130 E. Randolph St., Chicago 1, Ill. Subscription prices: to members, $2.00 a year; to non-members and institutions, $5.00 a year; single copies, $1.00. The opinions expressed in the columns of the Journal are those of the contributors and are not to be construed as reflecting the views of the American Association of Nurse Anesthetists.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THE PARENTERALS PAGE NUMBER 9

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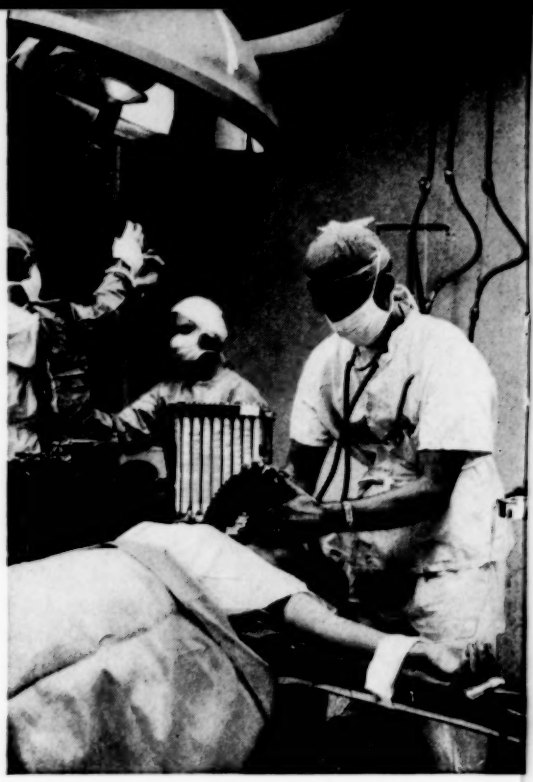

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*Cottrell, R. F., and Stoelting, V. K.: M. Times *89*:348 (April) 1961.

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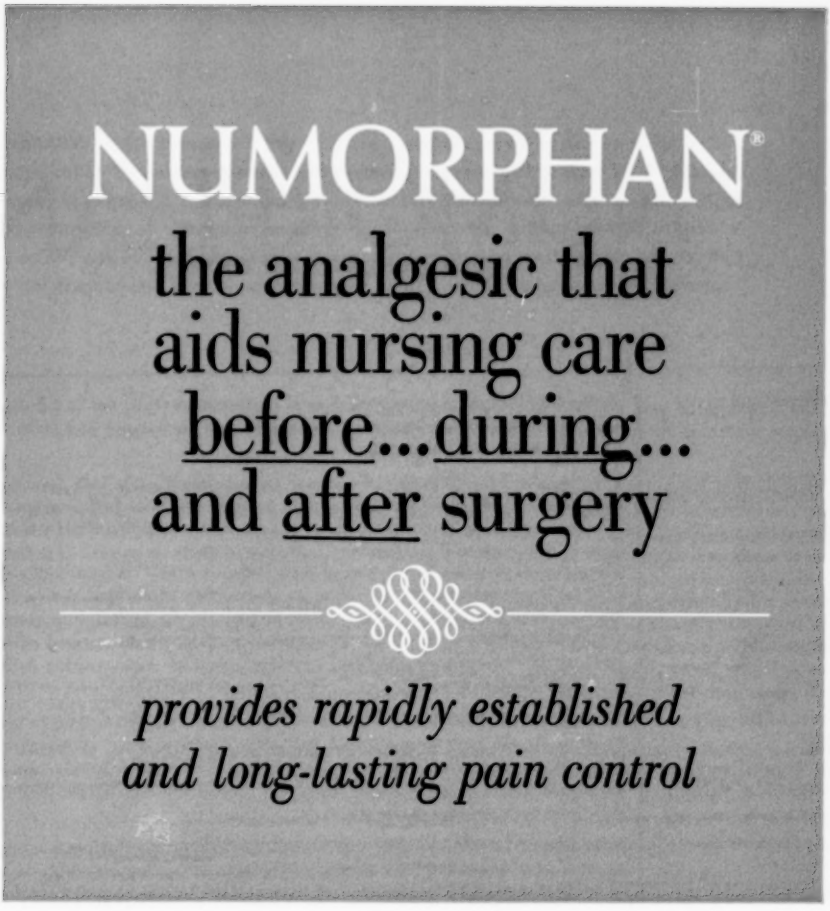

See within for advantages of NUMORPHAN as premedication / during anesthesia / in the recovery room / for postoperative analgesia / in emergency situations

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patients are tranquilized, not confused or disoriented

minimal likelihood of nausea or vomiting

The characteristic "NUMORPHAN effect" in premedication is well described by Appleton,[1] who used the drug in 434 patients one hour before surgery: "Patients receiving Numorphan came to operation tranquilized but without signs of confusion or disorientation.... in spite of the large number of patients who received scopolamine as part of their premedication." Nausea and vomiting were not found to be problems, an observation which confirms earlier findings[3] that NUMORPHAN is less likely to provoke the undesirable gastrointestinal reactions of morphine. Because of its sustained duration of effect, NUMORPHAN continues to provide "coverage" even when some delay in the O. R. schedule occurs.

effective adjunct during surgery

meets the need for supplemental analgesia

As Adjunct to Anesthesia: Experience[1,2] has shown that NUMORPHAN as a basal analgesic permits a marked reduction in the amount of anesthetic required thereby offering increased *safety* and *economy*. This reduction in anesthetic agents is particularly important for elderly, debilitated patients and those with pulmonary insufficiency.

rapid, smooth induction

NUMORPHAN facilitates rapid and smooth induction. The patient becomes capable of withstanding "the most powerful stimuli" without showing signs of being disturbed.[2] The analgesic effectiveness of NUMORPHAN is described as superior to that of meperidine in providing *supplemental* analgesia; the blood pressure usually remains within normal physiologic bounds, in contrast to the circulatory depression (often verging on shock) reported after meperidine.[2]

cough reflex retained

seldom affects circulatory and autonomic homeostasis

In a series of operations on the head and neck, patients maintained their airway and spontaneous breathing in spite of the severity of the procedure and massive bandages.[2] The patient usually remains quiet yet retains the cough reflex. The action of NUMORPHAN during anesthesia is usually characterized by the preservation of circulatory and autonomic homeostasis.[4] Where

clinically tested for 7 years / evaluated in 250 U.S. hospitals / over 3,000,000 doses given / more than 100,000 patients treated

SUMMARY: NUMORPHAN is a highly effective analgesic providing simple sedation and tranquilization that makes possible satisfactory preparation of patients of all ages for surgery. As an adjunct to anesthesia, NUMORPHAN facilitates smooth induction and reduces the amount of anesthetic agents required.[1,2] Postoperatively, NUMORPHAN-treated patients are usually well oriented and virtually free from pain or gastrointestinal side effects; they are not drugged into deep sleep and remain in full control of vital protective reflexes.[1-4]

prompt response to antagonists

indicated, as with inadvertent overdosage, intravenous nalorphine (Nalline®) or levallorphan (Lorfan®) is promptly effective in reversing respiratory depression.[5]

NUMORPHAN – satisfactory in the recovery room and special care unit

continuation of operative pain-free state

fewer injections required

In the Recovery Room: NUMORPHAN permits continuation of the pain-free state established during operation. The action of NUMORPHAN has proved "entirely satisfactory" in the "recovery room, special care unit, older patients and children..."[1] The patient who receives NUMORPHAN may be easily roused and is in control of his vital protective reflexes; thus, he can cough. In addition, his mental functions are not blurred, so that communication is readily possible. Other patients in the recovery room are rarely disturbed by the quiet NUMORPHAN patient. The pain relief extended by NUMORPHAN is usually so satisfactory in quality and duration that fewer repeat doses are required. Since NUMORPHAN does not commonly induce deep sleep, it often permits earlier discharge from the recovery room.

NUMORPHAN analgesia accompanied by sedation, not deep sleep

NUMORPHAN is primarily an *analgesic* not a *hypnotic;* therefore the absence of deep sleep should not be interpreted as lack of effective pain relief. Regarding this unique property of NUMORPHAN, Appleton[1] has stated: "It is most important that the entire nursing service be advised of this lack of soporific effect, especially if the nursing personnel is accustomed to using narcotics in hypnotic doses..."

NUMORPHAN should not be used to induce sleep

Postoperative Analgesia: When the patient is back in his room, NUMORPHAN keeps him mildly sedated and free from pain with a minimum of injections and untoward reactions. "It is inadvisable to attempt to achieve marked sedation characterized by sleep by increasing the recommended dosage."[1]

valuable for use in emergencies

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1. Appleton, J. C.: Anesth. & Analg. 39:505, Nov.-Dec., 1960. 2. Seigleman, M., and Wasmuth, C. E.: Cleveland Clin. Quart. 27:157, July, 1960. 3. Coblentz, A., and Bierman, H. R.: Fed. Proc. 14:327, Mar., 1955; New England J. Med. 255:694, Oct. 11, 1956. 4. Rondeau, Y.; Knaff, M., and Keerr-Szanto, M.: Union méd. Canada 90:48, Jan., 1961. 5. Adriani, J.: Postgrad. Med. 27:723, June, 1960.

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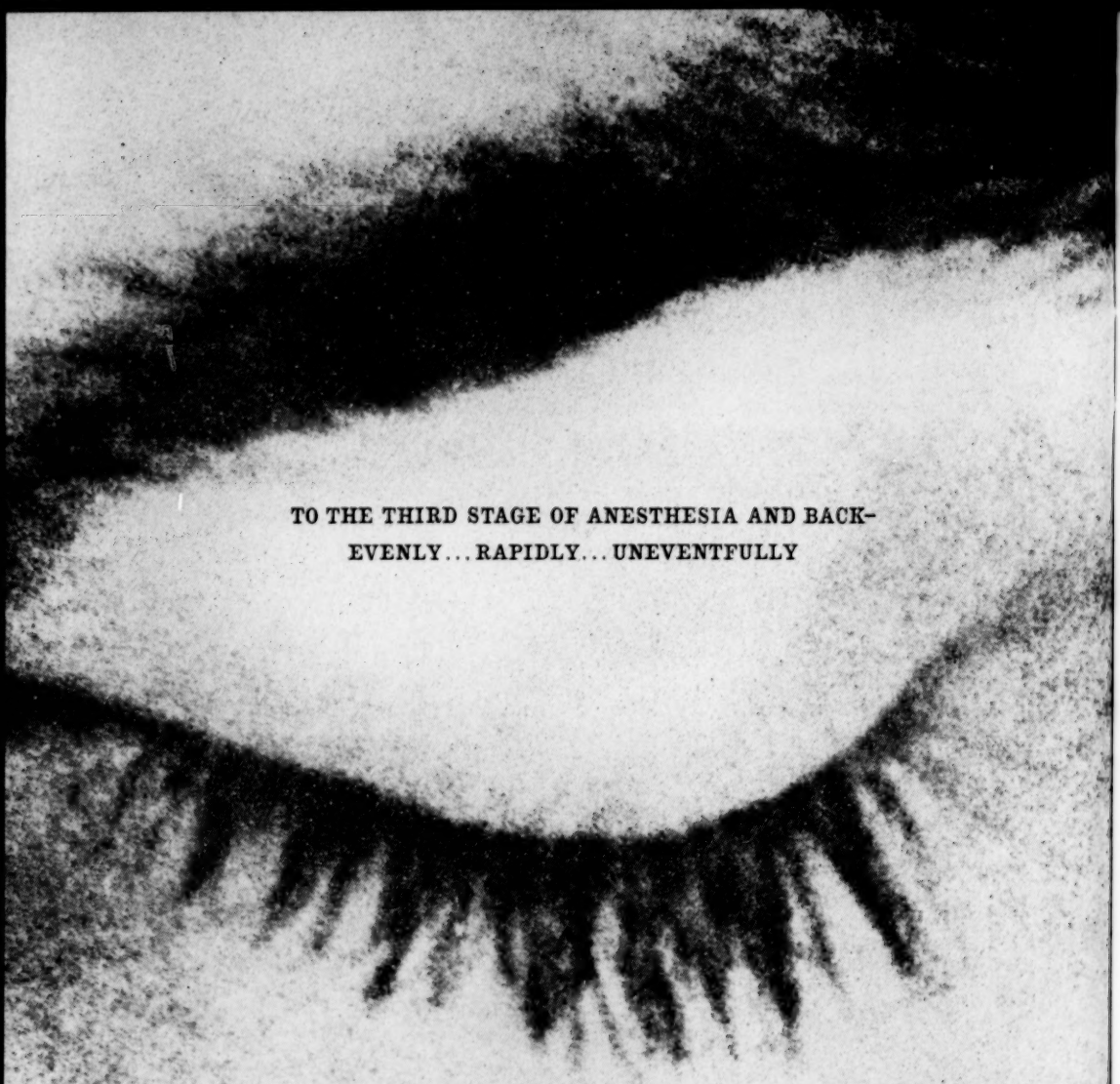

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TWENTY-EIGHTH ANNUAL CONVENTION AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

September 24-28, 1961

Atlantic City, N. J.

Hotel Headquarters — Ritz-Carlton Hotel

Sunday, September 24

Registration

A.A.N.A. Registration—8:00 A.M.-5:00 P.M., 3rd Floor Lounge, Ritz-Carlton Hotel

A.H.A. Registration —9:00 A.M.-8:00 P.M., A.H.A. Headquarters, Traymore Hotel Lobby

Go to special section of registration tables marked ANESTHETISTS. Bring your advance registration card which you should have received by mail.

PROGRAM

Joint Meeting of the Council and Assembly of School Directors 9:00 A.M.-5:00 P.M., Ballroom, Ritz-Carlton Hotel.

Although this program is of specific interest to national and state officers, and directors of schools of anesthesia, ALL members are invited to attend these sessions.

DISPLAY OF SCHOOL EXHIBITS

Ballroom, Ritz-Carlton Hotel

Monday, September 25

Registration

A.H.A. Registration —8:00 A.M.-5:00 P.M., Convention

Go to special section for ANESTHETISTS. Bring your advance registration card which you should have received by mail.

A.A.N.A. Registration—8:00 A.M.-5:00 P.M., AANA Booth 194, Convention Hall

9:00 A.M. **Official Opening**

General Session, Convention Hall

Evelyn E. Auld, C.R.N.A., President, A.A.N.A., Presiding

Invocation

Bernard V. Bowen, C.R.N.A.

Address of Welcome from A.H.A.

Address of Welcome

Evelyn E. Auld, C.R.N.A., President, A.A.N.A.

9:15 A.M.	Virginia A. Edwards, C.R.N.A., Past-president, Georgia Association of Nurse Anesthetists, Presiding Officer
	Narcotics and the Anesthetist
	John S. Lundy, M.D., Anesthesiologist, V.A. Research Hospital, Chicago, Illinois
10:15 A.M.	**Fluothane**
	M. Bourgeois-Gavardin, M.D., Director, Department of Anesthesiology, Watts Hospital, Durham, N. C.
11:15 A.M.	**Hypothermia**
	Ann E. Starcovic, C.R.N.A., Charleston General Hospital, Charleston, W. Va.
2:00 P.M.	**General Session,** Convention Hall
	Minerva McLane, C.R.N.A., President, Florida Association of Nurse Anesthetists, Presiding Officer
	Problems of Anesthesia Specific to the Pediatric Patient
	Robert M. Smith, M.D., Anesthesiologist, Children's Hospital, Boston, Mass.
3:00 P.M.	**Values Re-evaluated**
	Cameron W. Meredith, Ph.D., Educational Advisor, A.A.N.A.
7:00 P.M.	**State Night Dinner,** Ritz Hall, Ritz-Carlton Hotel
	E. Ruth Stephens, C.R.N.A., Chairman, Convention Committee, Presiding Officer
	Tuesday, September 26
9:00 A.M.	**Business Session,** Convention Hall
	Evelyn E. Auld, C.R.N.A., President, A.A.N.A., Presiding
11:00 A.M.-1:00 P.M.	**Election of Officers**
2:00 P.M.	**Business Session,** Convention Hall
	Wednesday, September 27
9:00 A.M.	**General Session,** Convention Hall
	Ray E. Weeks, C.R.N.A., President, Mississippi Association of Nurse Anesthetists, Presiding Officer
	Newer Drugs in Anesthesia
	Ray G. Stark, M.D., Director, Anesthesia and Inhalation Therapy, Baptist Memorial Hospital, Memphis, Tenn.
10:00 A.M.	**The Endocrine System in Relation to Anesthesia**
	Helen Vos, C.R.N.A., Barnes Hospital, St. Louis, Mo.

11:00 A.M.	**Use of Fluothane in Oral Surgery and Dentistry** James Jones, D.D.S., M.D., Asst. Prof. Anesthesiology, University of Alabama, Birmingham, Ala.
2:00 P.M.	**General Session,** Convention Hall M. Katherine Smith, President, Kentucky Association of Nurse Anesthetists, Presiding Officer **A Problem of Blood Replacement During Anesthesia** Lester Rumble, Jr., M.D., Director of Anesthesiology, St. Joseph's Infirmary, Atlanta, Ga.
3:00 P.M.	**The Physiologic Effects in Relation to the Heart Lung Machine** Arthur E. Ogden, M.D., Director of Anesthesiology, Cincinnati General Hospital, Cincinnati, Ohio
4:00 P.M.	**Blood Electrolytes in Relation to Anesthesia** John W. Adriani, M.D., Department of Anesthesia, Charity Hospital, New Orleans, La.
7:00 P.M.	**Banquet,** Crystal Room, Ritz-Carlton Hotel Evelyn E. Auld, C.R.N.A., President, A.A.N.A., Presiding
	Thursday, September 28
9:00 A.M.	**General Session,** Convention Hall George Bondranko, C.R.N.A., President, Virginia Association of Nurse Anesthetists, Presiding Officer **Evaluation of the Patient with Renal Disease for Anesthesia** Julia G. Arrowood, M.D., Anesthesiology, Harlan Memorial Hospital, Harlan, Ky.
10:00 A.M.	**Evaluation of the Patient with Respiratory Disease for Anesthesia** Harry G. Benz, M.D., Anesthesia Department, Washington Hospital, Washington, Pa.
11:00 A.M.	**Evaluation of the Patient with Cardiac Disease for Anesthesia** D. LeRoy Crandell, M.D., Associate Professor and Chairman, Department of Anesthesiology, Bowman Gray School of Medicine, Winston-Salem, N. C.
12:00 Noon	**Unfinished Business and Adjournment**

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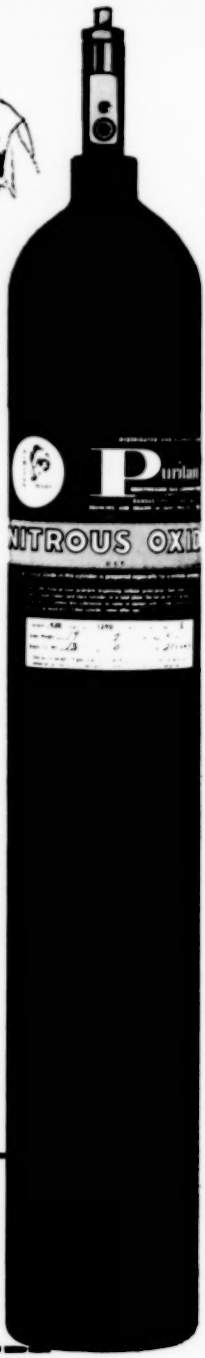

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Newer Mechanical Aids to Respiration in Critical Illness

John B. Bobear, M.D.*
New Orleans, Louisiana

Within recent years there has been a marked change in the attitudes of the medical profession towards the therapeutic management of many chronic inflammatory bronchopulmonary disorders. Not too many years ago, middle-aged male patients who presented with cough and dyspnea on exertion, in the absence of heart disease, were considered to have pulmonary emphysema that progressed relentlessly to an early death and for which nothing could be done. Until recently it has been an aphorism that patients with bronchial asthma never die of their disease, and that patients with mucoviscidosis (cystic fibrosis of the pancreas) die during early childhood of pulmonary inflammation now considered a part of the disease.

It is now known that these statements are erroneous. Patients with pulmonary emphysema can live productive lives, patients with bronchial asthma do die of asthma and patients with mucoviscidosis can survive into young adulthood.

These changes have come about through the development of effective antibiotics for the treatment of pulmonary infection, and through the use of various mechanical aids to respiration that have been developed in the laboratories of physiologists and clinicians interested in pulmonary diseases.

These mechanical aids to respiration include such things as nasal oxygen, BLB mask, meter masks, oxygen tents, etc., with which we are all familiar, and newer aids such as intermittent positive pressure breathing, nebulization therapy, and mechanical means for reproducing cough in the severely ill respiratory cripple who has ineffective cough. It is these latter aids that will be discussed in this paper.

INTERMITTENT POSITIVE PRESSURE BREATHING

Intermittent positive pressure breathing consists of the application of positive pressure to the upper airway during the inspiratory phases of breathing, thus establishing a pressure gradient from the mouth, where the pressure would be high, to the pleural space, where the pressure is low. This is accomplished with a system con-

*Assistant Professor of Medicine, Louisiana State University School of Medicine, New Orleans, La., and Department of Inhalational Therapy, Charity Hospital of Louisiana at New Orleans, La.

Presented to the Louisiana Association of Nurse Anesthetists, New Orleans, Louisiana, June 5, 1961.

necting pressure-tight masks or mouth-pieces worn by the patient with a flow or pressure-sensitive inspiratory demand valve that delivers compressed gases, such as oxygen, oxygen-air, air or helium-oxygen mixtures, from storage cylinders or piped in oxygen supply systems. In essence, then, we have the same system that is used in giving closed inhalation anesthesia, except that the anesthesia gas bag is replaced by a mechanical pressure-sensitive valve, the intermittent positive pressure breathing machine.

There are many makes and models of positive pressure breathing machines now flooding the market. The Bird Mark VII, the Ventalung (or Monaghan), the Bennett, the Halliburton, and the Mine-Safety Appliance are some of the more commonly used ones. There are others. All of these units have controls for presetting the inspiratory positive pressure to be obtained and gauges for reading the actual pressures that are obtained in the patient while the machine is operating.

They all have an expiratory valve in the manifold close to the patient's mouth (thus reducing dead space) that is controlled by a separate flow of gas conducted through a separate tube from the machine to the valve. Any breaks or leaks in this tubing will cause inspiratory leakage through the exhalation valve and malfunction of the machine. Except for the Bird Mark VII and the new Bennett, the inspiratory flow rate (in liters per minute) is fixed and cannot be increased or decreased. I consider this a disadvantage. All of the machines can be cycled manually and can thus be used for resuscitation. Some of the machines have a dial whereby the sensitivity of the inspiratory pressure valve can be increased or decreased at will to fit the requirements of the individual patient. This is especially useful in patients with weak inspiratory effort, in which case the valve can be adjusted to respond to just the smallest change in pressure. All of the machines have small nebulizers in the manifold operated by a gas supply separate from the main-stream. All of the machines with the use of appropriate adapters can be used in the tracheostomy patient.

As far as I know at the present time, the Bird Mark VII and the new Bennett are the only machines on the market with most of the desirable features incorporated in one machine, i. e., varying inspiratory flow rate, control for changing sensitivity of the flow-sensitive valve and built-in effective automatic cycling.

These machines can be operated on demand by the patient, manually by an operator, or automatically. Demand use is employed in all patients who can develop enough inspiratory negative pressure in the closed system to trip the pressure sensitive valve, permitting inspiratory gas flow to start. In the apneic patient, the valve can be tripped manually or automatically. Gas flows until the inspiratory pressure in the system reaches the pre-set pressure, most commonly 15 to 20 cm. of water. When the pre-set pressure is reached, the pressure sensitive valve closes, and expiration takes place passively (as it normally does) through the exhalation valve in the manifold. With the start of the next inspiration, the cycle is repeated. It is obvious then that when used on demand the patient can control his own respiratory rate by controlling the time of

initiation of his inspiration. In patients who are conscious and co-operative this is important, because the operator can instruct the patient not to breathe too fast and to spend all the time he can exhaling. This insures adequate time for alveolar distribution of the inspired gas (and nebulized medications), diffusion of oxygen into the blood, and excretion of carbon dioxide. This is essential in the management of patients with acute and chronic obstructive lung disease such as asthma and emphysema where hypoxia, carbon dioxide retention, and inspissated secretions play a major pathogenic role.

It has been shown that intermittent positive pressure breathing with nebulized bronchodilators and other substances cause the lung to be inflated to a greater degree than would occur with normal breathing producing aeration of previously unaerated portions of the lung, widening and elongation of the bronchi during inspiration and decreasing bronchial resistance, thus facilitating bronchiolar drainage, oxygenation of the blood and exhalation of carbon dioxide.

In the practice of medicine, these machines aid in the accessory therapeutic management of two groups of problems—at times they are life-saving—1) diffuse, acute and chronic inflammatory bronchopulmonary disorders, and 2) disease processes which cause hypoventilation.

Some of the diseases which fall into the former category are chronic bronchitis and emphysema, bronchial asthma, cystic fibrosis of the pancreas, severe broncholitis associated with pulmonary viral infections, inhalation of irritating gases, bronchiectasis, and pulmonary edema.

Many of these diseases, asthma and emphysema typically, are characterized by diffuse air-way obstruction in the distal portions of the lungs produced by mucosal edema, secretions and exudate, bronchial muscle spasm, mucosal hyperplasia, peribronchial fibrosis and expiratory air-way collapse due to diminished elasticity of the lungs and bronchioles. This is particularly pronounced during acute exacerbations of these diseases resulting in further hypoxia, hypercapnia and increased work of breathing. Intermittent positive pressure breathing with 40 to 100% high humidity oxygen, nebulized bronchodilators, bronchovasoconstrictors, deteryolytics and enzymes given intermittently over a 24-hour period of time facilitates reversal of this process. Frequency of therapy depends on the severity of the disease. It is not uncommon for patients with status asthmaticus and pulmonary emphysema with superimposed pneumonia and cor pulmonale to become so exhausted from the prolonged increased work of breathing that physical fatigue becomes prominent, and muscular weakness ensues resulting in ineffective coughing and clearing of secretions with increasing hypoventilation, hypoxia, hypercapnia and impending death. At these times continuous intermittent positive pressure breathing is often the therapy which turns the tide.

The second group of diseases or conditions in which intermittent positive pressure breathing is of value are those which cause or result in hypoventilation.

Anesthetists are all aware of this term and are concerned with it daily. As we know, the main function of the lung is to maintain normal oxygen saturation and carbon dioxide

content of the blood. To do this an adequate amount of air must arrive at the alveoli with each breath to supply oxygen and to take on and exhale carbon dioxide. The amount of air needed to maintain normal blood, oxygen and carbon dioxide levels can be measured in the laboratory and estimated at the bedside. This amount of air in the resting individual is measured in liters per minute and is equal to the tidal volume multiplied by the respiratory rate. This is the total resting minute ventilation. If you subtract the anatomical dead space from the tidal volume and multiply this by the respiratory rate, you obtain the resting alveolar minute ventilation—that part of the inspired air which actually participates in alveolar gas exchange. Any decrease in the minute ventilation produces what we shall clinically call hypoventilation. The dangers inherent in hypoventilation if allowed to persist are progressive hypoxia, hypercapnia, respiratory acidosis and death.

The clinical causes of hypoventilation are many and are listed in the accompanying table.

The important physiological principal in the treatment of hypoventilation is the term "ventilation." Just giving 100% oxygen, although it will correct hypoxia, will not correct hypercapnia, and carbon dioxide levels will continue to rise producing acidosis and coma. The only method for maintaining normal carbon dioxide levels is to re-establish a normal minute ventilation, and thereby permit carbon dioxide to be "blown off." It is apparent then, that in those cases of hypoventilation due to apnea produced by respiratory muscle paralysis or central medullary respiratory depression, mechanical ventilation (artificial resuscitation) is the indicated treatment. This can be done manually by various methods including mouth to mouth breathing, by the anesthetist with the anesthesia gas bag, by placing the patient in a tank respirator, or by using intermittent positive pressure breathing on manual or automatic cycling. Of course, the maintenance of a patent air-way is a basic principle in all four forms of treatment.

The table also shows that various types of lung disease can result in hypoventilation. Those intrinsic diseases of the lung characterized by obstructive lesions either in the upper or lower air-way can produce hypoventilation because of increase in the dead space that occurs as a result of obstruction. This implies then, that to continue to maintain normal blood oxygen and carbon dioxide levels the minute ventilation must be increased, and/or the obstruction relieved. Obstruction in the large air-way can be relieved by bronchoscopy, but obstruction in the small distal passages, as occurs in asthma and emphysema, can only be relieved by bronchodilation and clearing of secretions. Intermittent positive pressure breathing in these cases increases the effective alveolar minute ventilation, and by the use of various nebulized medications helps to clear secretions, thus reducing the degree of hypoventilation.

EXSUFFLATION WITH NEGATIVE PRESSURE

In the preceding discussion the importance of clearing the tracheobronchial tree of secretions and exudate in order to provide adequate ventilation has been mentioned. Doing this may be the difference between success or failure in a given case. Secretions in the larger tubes can be aspirated by endotracheal suction per os or per

CAUSES OF HYPOVENTILATION

1. Depression of respiratory centers by general anesthesia, excessive doses of morphine or barbiturates, cerebral trauma, increased intracranial pressure, prolonged anoxia or cerebral ischemia, high concentration of CO_2, or electrocution.
2. Interference with neural conduction or with neuromuscular transmission of the respiratory muscles by traumatic spinal cord lesions, infections such as poliomyelitis, peripheral neuritis, or neuromuscular block produced by curare, decamethonium, succinyl choline, nerve gases, myasthenia gravis, botulinus or nicotine poisoning.
3. Diseases of respiratory muscles.
4. Limitation of movement of thorax by arthritis, scleroderma, emphysema, thoracic deformity, or elevation of the diaphragm.
5. Limitation of movement of lungs by pleural effusion or pneumothorax.
6. Pulmonary diseases
   a) decrease in functioning lung tissue caused by atelectasis, tumor or pneumonia;
   b) decreased distensibility of lung tissue as in fibrosis or congestion;
   c) obstructive lesions in the upper or lower respiratory tract.

Comroe, J. H., Jr.; Forster, R. E., II; Dubois, A. B.; Briscoe, W. A. and Carlsen, E.: Pulmonary Ventilation, in The Lung (Chicago: Year Book Publishers, Inc., 1955), pg. 36.

tracheostomy, and if inspissated by bronchoscopy. But, no suction tube can reach the exudate that is "locked" in the smaller bronchioles in the more peripheral and major portions of the lungs. This material can only be mobilized by effective coughing, which moves it to the larger bronchi where it can be aspirated. Many of these patients cannot cough effectively, especially during acute re-exacerbation of their disease, where extreme muscular fatigue, or marked increase in the obstructive component make coughing ineffective or impossible. One must realize that in patients with normal lungs who hypoventilate, e. g., poliomyelitis, coughing is ineffective or absent because of involvement of the lung bellows. Retention of secretions in these individuals can produce obstruction in the smaller bronchioles with pneumonitis that can greatly complicate the problem.

Cough, then, is an important mechanism. What is it physiologically? If one coughs for a minute and thinks about what he is doing, he can analyze cough into several components. It will be noticed that one doesn't just cough once, but that a cough is a series of six to eight individual "blasts" occurring one after the other over a period of seconds. Each "blast" is preceded by a deep, rapid inspiration, with the inspired air being distributed to the most distal and peripheral portions of the lung, and is immediately followed by a forced expiration against a closed glottis. This increases the pressure in the air-ways as high as 80-120 mm. of mercury above atmospheric. The glottis then opens, and the air "bursts" forth explosively carrying exudate in front of it, producing the audible sound that is called cough.

It is now clear how important it is to reproduce cough in the critically ill patient who cannot. There are machines available for this purpose. This device, which is termed Exsufflation with Negative Pressure, consists of a high-speed blower motor unit which introduces a large volume of air into the lungs through a tight face mask until a pre-set pressure of 20-40 mm. of mercury is obtained. At this point a valve is automatically switched to the negative (vacuum) pressure side with a resultant drop in pressure to

—40 mm. of mercury. This drop in pressure occurs within .02 seconds and produces an expiratory flow rate similar to that of a normal, vigorous cough. At peak inspiratory pressures, the bronchi are widened, enabling air to traverse bronchiolar mucous plugs to the alveoli, so that during the high velocity expiration the secretions are brought up and out.

Frequency of use of this machine depends on the severity of the illness and the individual problems of each patient. It is usually used several times daily with each treatment consisting of five to six one-minute intervals with eight to ten respiratory cycles per interval. Exsufflation may be more efficient if preceded by intermittent positive pressure breathing with nebulized medications. Endotracheal and pharyngeal suction should be performed immediately after a "cough" treatment, especially in the comatose patient.

HUMIDIFICATION

Lastly, some mention must be made of the role of humidification in the management of patients with bronchopulmonary inflammatory diseases, patients with tracheostomies, and the other conditions where continuous intermittent positive pressure breathing is indicated.

Usually, inhaled atmospheric air has a lower temperature (about 25° C.) than exhaled air. Although the atmospheric air may be nearly completely saturated with water vapor (i. e., may have a high relative humidity), when it enters the body, it is heated to body temperature (normally 37° C.) and the relative humidity of this air decreases. Water vapor is then added by evaporation from the nasopharyngeal and tracheobronchial mucosa. This natural humidifying mechanism prevents low humidity air from drying out tracheobronchial tissues.

Therapeutic oxygen is an almost dry gas, and if not humidified prior to being inhaled by the patient would produce drying of the tracheobronchial tissues, thus interfering with the production of mucus and the ciliary action of bronchial mucosa, that in turn facilitates the development of obstructive pneumonitis. This complicates the very disease for which the oxygen is being given.

The simple bubble type humidifier is usually adequate for patients receiving nasal oxygen who do not have inflammatory lung disease. The acute and chronic inflammatory lung diseases may be associated with thick secretions and exudate that interfere with the humidifying ability of the normal mucosa. These individuals need high humidity oxygen or air to prevent further drying and aid in the mobilization of secretions. This can only be done with the use of mist or aerosol nebulizers. There are many sizes and types of nebulizers on the market. The best are those which produce liquid particles in the gas, from 0.5 to 3.0 microns. This insures that the moisture gets to the most distal bronchioles, where inspissated secretions and exudate may exist. The smallest nebulizers (5 cc.) are used to introduce nebulized bronchodilators, and other medications for short intermittent periods of time. The large nebulizers (500 cc.) are used when continuous inhalation therapy is being employed. These large nebulizers can be used in place of the nasal oxygen bubble humidifier. There are models adapted to fit most of the intermittent positive pressure breathing machines,

wherein the entire supply of gas to the patient is conducted through the nebulizer, producing high humidity; these are called main-stream nebulizers. Some of the large nebulizers are supplied with heating elements which raise the temperature of the liquid and air breathed by the patient to 105° F. to 125° F., increasing the total amount of water vapor which reaches the lower air-ways.

The aerosol nebulizers should be used in those patients with tracheostomy who need oxygen. Special plastic collars, with side vents are available for this purpose. A nasal catheter should never be placed in a tracheostomy tube unless it is an emergency.

SUMMARY

I have attempted to present a description of relatively newer mechanical aids used in the therapy of various medical conditions. I have outlined their method of operation and some of the indications for their use. I hope that I have emphasized their life-saving value, and the need we have for these aids in the every day practice of medicine. These machines are intricate and require some degree of knowledge and skill if they are to be used properly. Improper use and the lack of constant monitoring make them potentially very dangerous, especially in the apneic patient. Many physicians and nurses are unaware of the advantages of these devices and all too many do not know how to use them properly, if at all. In the minds of most physicians this type of therapy is associated with the function and activities of the anesthesiologist and the anesthetist. In the smaller hospital the physician often turns to them for advice and help in operating the equipment. It behooves the anesthetist then, to be aware of the newer changes in inhalational therapy, and to learn how to use the equipment so that he or she may aid and participate in the successful management of the medically ill patient.

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The Preoperative Evaluation and Preparation of the Elderly Surgical Patient

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The title of this paper reflects our concern with a specific group of patients. The reason for its importance in the elderly patient is: 1. He is more prone to problems from underlying disease. 2. There is less margin for error. 3. There is less stamina, fewer resources and less reserve to fall back on as a cushion.

The trip down the road of life has not only exposed the patient to more diseases, but he may carry residuals of previous disease processes.

An oversimplification of the problem, but a basically correct one, is that major disturbances of anesthesia are only quantitatively different between the elderly patient and the younger subject. With the continued rise of the mean duration of life, the percentage of operations done in the elderly has risen to 15 per cent.

Some people prefer "aged" to "elderly" because of a possible connotation of "feebleness" with growing old. People do not want to be considered as old but no man is immortal. Jonathan Swift said, "Everyone desires to live long, but no one would be old." In the United States there now are 15 million people over the age of 65. "There are no diseases of old age, only diseases of old people." Aging is not a pathological response but a normal physiologic process. The rapidity of aging does differ and various theories have been presented as to its causes and to its effects. The physiologic changes or patterns occurring in the aged are responsible for the difficulties peculiar to their management. These changes and effects must be restored to a status as near normal as possible. Correction of deficiencies and restoration of function provide maximum insurance for uncomplicated recovery.

Freeman[6] described the general appearance of the aged and noted **external** changes which are the most visible manifestations of aging, characterized by loss of water, fat, hair and turgor of the skin and a decrease in its regenerative capacity. The **bones** become atrophic, osteoporotic or brittle. The changes occurring in the **cardiovascular** system are dehydration, loss of ability for cellular replacement and vascular degeneration. The hypertrophied heart shows brown atrophy of the muscles and the vessels show atheromatous calcification with loss of elastic tissue. Elevation of the blood pressure may be an effect of these.

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Presented at the annual meeting, Ohio Association of Nurse Anesthetists, Columbus, April 4, 1961.

With age, atrophy of the lung fields causes a reduction of 25 per cent of the **respiratory** capacity. Emphysema and pulmonary fibrosis of a varying degree are seen in a majority of the aged patients.

The **gastrointestinal** changes of the geriatric patient with its decrease in gastric juices and acid results in impaired digestion and absorption and consequent malnutritions and resultant **blood** changes—particularly the well recognized decrease in blood volume. The **genitourinary** changes with its renal and adrenal deficiencies and the **nervous system** changes of confusion, emotional lability and "childishness" as a result of cerebral sclerosis or multiple small thrombi, are well known. The common observation that "Grandpa isn't the same since his operation" is, unfortunately, quite true.

But I wish to present for your consideration a few simple thoughts and facts. These are facts based only on clinical experience because basic research in the older age group is regrettably weak. Management of the elderly patient undergoing surgery is a challenge to all related to the art and science of modern medicine. A fact to consider before those strictly medical, is that the emotions associated with surgery play an important role in geriatric patients and must be taken into account. Loneliness, boredom and apathy are the three enemies of the elderly patient. The family has grown up and left them. There is no daily job to occupy them; there is no reason to continue existence. The social, economic and moral aspects of this problem are legion. In the old days 'granny' used to die of a broken hip because of the rapidly developing pneumonia, frequently labeled "the friend of the elderly," but today with our better nursing, surgical and anesthesia care along with the miracle of antibiotics, 'granny' lives, sometimes to the dismay of her family who go into debt to pay her $10,000 hospital bill. But this is more of a philosophical or religious concern than scientific. Therefore, let us return and point out that extensive, mutilating surgery which may prolong life but leaves a regrettable problem for the patient, for his family, or for his community, is not justifiable. Our responsibility is to relieve pain and suffering; not to contribute to it.

Anesthesia is a special problem because the aged do not have the respiratory and circulatory reserve of most younger patients. The aged patient's ability to compensate for depressed respiration and circulation is markedly diminished. Therefore, the anesthetist must avoid any undue depression, and be ready at all times to reverse the depressed state which he induces in the patient. It is not enough to know how to get out of trouble, one must be able to recognize trouble or better yet, how to anticipate trouble and perhaps avoid or minimize it. For example, it has been seen repeatedly that premedication has a more pronounced effect on the aged patient.

All risks are relative and it is up to the doctor to decide the relative merits and importance of the disease processes. In other words, should a case of acute appendicitis with cardiac disease be digitalized slowly (which may be better for the patient's heart), or rapidly (to avoid a ruptured appendix)? On the other hand, the "decision to operate" is not a license to disregard associated conditions. We sometimes must be satisfied with an amelioration of the

symptoms instead of a cure. This fact has been very difficult for some people, particularly the younger surgeons, to accept.

During the operation, the most common cause of death on the operating table is irreversible shock resulting from an inadequate blood volume before surgery and/or loss at operation without adequate replacement. The second most common cause is myocardial damage due to persistent hypotension, hypercapnia or hypoxia, resulting in arrhythmias or cardiac arrest. Greeley[7] states that the hyperactive carotid sinus reflex should not be forgotten.

Postoperatively, the causes of death are primarily cardiac or pulmonary resulting from an operative or postoperative complication. A complication in the aged seems to lead in arithmetical progression to others. Obviously the most effective treatment is prevention of any complications. It is apparent that proper consideration of the patient's condition is not only necessary but of paramount importance. And it is the potentially reversible factors which must be considered and corrected. Our prime concern is, therefore, to limit the operative risk in any and all ways possible.

The "Essential Triad" of Rankin and Johnson[13] of surgical judgment, speed, and gentleness still obtain for surgical success and especially for the elderly patient. This might be a good time to point out the importance of comfort of the patient when he is on the operating table. It is difficult to relax and maintain one position for any length of time. Soft parts and joints should be padded; extremes of any kind should be avoided; and undue stretching must be guarded against. Positions which decrease pulmonary ventilation and maintenance of circulation are our concern as well as the change of the patient from one position to another during the operation, such as is done in an abdomino-perineal resection, or after the surgery, such as the transfer of the patient to the stretcher.

As Oliver Wendell Holmes put it "a moment's insight is sometimes worth a life's experience." Applied to the individual patient this means, learn everything possible about the patient before proceeding. Therefore, we are cautioned to elicit a complete history, the value of which cannot be overemphasized. Old records must be obtained to substantiate or to fill in for the faltering memory of the patient; family or friends may be called upon to give further information or even a telephone call can be made to the family doctor or to other hospitals.

The next point is a complete physical examination. In our hospital we do a sigmoidoscopy as part of a physical examination. The reason for this is that 70 per cent of cancers of the colon are within reach of the sigmoidoscope. In other words, this is a better return for our effort than examination of cervical smears or thyroid nodules. We also get a chest x-ray film, a complete blood count, a urinalysis and serology on admission. In the preoperative period a BUN, a prothrombin time and an EKG are definitely indicated. A protein determination with an AG ratio will help indicate general nutrition or liver disease.

The medical consultation is a request for help in limiting the risk to this patient. The surgeon asks, "Have I missed anything?" for only he can give "clearance for surgery."

The following, in outline form, are the areas requiring preoperative evaluation, consideration and preparation.

I. Cardio-Vascular — There is almost no cardiac patient in whom urgent surgery cannot be considered and performed safely provided an experienced team; cardiologist, anesthesiologist and surgeon, is available.

A. Cardiac Conditions
1. Chronic—static
2. Chronic—exacerbation
3. Acute
   a. Congestive failure
   b. Arrhythmias
   c. Coronary insufficiency

B. Blood Volume—restore to normal
1. Malignancy (100 cc. per pound of weight loss)
2. Closed fractures (fractured hip —3 units)
3. Jaundice
4. Hemorrhage—pulse must be under 100
5. Malnutrition

"Very few over-transfused for the dozens under-transfused."

C. Hypertension—may be due to conditions other than cardiovascular.
1. Attempt to establish normotensive state
2. Avoid wide swings in pressure
3. Antihypertensive drugs
4. Other diseases—pheochromocytoma

D. Arteriosclerosis—a generalized disease
1. Hypotension poorly tolerated
2. Complications or resultant conditions—arteriosclerosis obliterans

II. Respiratory System

A. "Satisfactory tissue gas exchange—not chest x-ray or chest shape"
1. History—occupation, childhood diseases, smoking, physical activity
2. Signs and symptoms—dyspnea, cyanosis, rales and rhonchi
3. Chest x-ray
4. Pulmonary function tests

B. Chronic suppurative disease—"wet lung"
1. Decreases O_2 exchange
2. Decreases anesthetic absorption
3. Makes anesthesia level more difficult
4. Spreads contaminated material

C. Correction — emotional trauma of the therapeutic program
1. No smoking for two weeks
2. Postural drainage
3. Breathing exercises—rebreathing tube
4. Antibiotics for specific infections
5. Intermittent positive pressure breathing—Isuprel

III. Body Fluids and Electrolytes

A. Needs per day—2500 cc. H_2O; 100 mEq. Na; 130 mEq. Cl; 80 mEq. K

B. Nature and duration of disease
1. Starvation
2. Obstruction—vomiting—alkalosis
3. Burn, peritonitis, pancreatitis (similar and should be treated as such.) Follow blood pressure, pulse and urinary output

IV. Renal System

A. Elevated BUN—above 30 mgm. per cent
1. Renal insufficiency
2. Other causes—dehydration, starvation, G. I. bleeding

B. Fixed specific gravity—renal reserve

C. Infection—urine sediment—relation to hypertension

V. Hepatic System

A. Diagnosis—history, examination, prothrombin time, liver function tests

B. Result of hepatic disease
1. Blood volume deficit
2. Lowered serum proteins
3. Lack of detoxification—NH_3
4. Bleeding tendency

VI. Miscellaneous

A. Anticoagulants
1. Reason for giving
2. Treatment—Vitamin K or K_1

B. Adrenal insufficiency
1. Disease
2. Iatrogenic — corticoid therapy within 2 years — Slocumb and Lundy point out that with the increased use of cortisone and ACTH, the surgeon and anesthetist must be on constant lookout for patients who have been given these hormones, in order to avoid a circulatory collapse at the time of operation or during the postoperative recovery period.
3. Treatment — 100 mgm. hydrocortisone I.M. per day for 3 days preop. and for 3 days postop.

C. Airway
1. Bleeding about the head and neck
2. Mediastinitis
3. Carious or loose teeth
4. Laryngeal obstruction—spasm or foreign body
5. Empty stomach as a prevention or precaution to prevent aspiration and/or obstructive pneumonia
6. Empty tracheo-bronchial tree—postural drainage, endotracheal aspiration as a treatment.

In conclusion, with adequate preoperative evaluation, consideration, preparation, correction, restoration of normal values, the prognosis of the elderly patient is good and the mortality and morbidity is reduced.

The final words for surgeons as well as anesthetists are: 1. Know how to keep out of trouble, but, 2. Know when you are in trouble, and, 3. Know how to get out of trouble.

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Anesthesia Problems In Head and Neck Plastic Surgery

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It is not the purpose of this discussion to deal with the merits or techniques of various anesthesia. This would be presumptuous. It is merely desired to emphasize some observations from the other side of the table.

It would seem that anesthesia problems in head and neck plastic surgery stem from three sources — the surgeon, the anesthetist or anesthesiologist, and the patient. All three have knowledge which should be shared. Since the individual patient is, within limits, an immutable factor, let us examine ourselves first and see what may be done.

Obviously it is the surgeon's duty to know his patient. This implies not only awareness of the specific difficulty considered, but also an adequate survey of the patient's physique and psyche. It is poor business to overlook other malfunctioning or deficient systems, or to minimize the emotional impact upon the patient of the contemplated unpleasantness. In addition, a definite plan of surgical attack should be made and a reasonable knowledge of the time required to effect it must be had. This information is most useful and it is not classified. Too frequently, due to thoughtlessness, much that would be helpful is not passed along.

The anesthetist or anesthesiologist must likewise evaluate the patient, utilizing his or her own observations of the patient in conjunction with that obtained from the surgeon. Knowledge of the problem and difficulties likely to be associated with it are mandatory. Without this, there cannot be proper selection of agents and equipment. Improper preparation is at least irksome and may be fatal.

Lack of equipment or failure to check it is the certain road to confusion and disaster. Adequate facilities for suction must be present and working. Appropriate laryngoscopes, with lights that light, together with a suitable selection of masks, tubes, connections and drugs must be instantly available.

This is but a start. The smooth and careful induction (facilitated by correct premedication), maintenance of, and recovery from the anesthesia not only assures survival but reduces morbidity. It further enhances the eventual success of the procedure, by permitting the surgeon to work without distraction. The need for an agreeable anesthesia is also empha-

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Presented at Annual Meeting, Kentucky Association of Nurse Anesthetists, March 21, 1961, Lexington, Kentucky.

sized by the fact that many patients will be coming back for return engagements. These will be less trying for all parties if there are no distasteful memories.

Since quarters are cramped, mutual compromise by the surgeon and anesthetist is necessary so that the procedure may be accomplished. The former desires as roomy and sterile a field as possible; the latter, safe, controlled anesthesia. In almost every instance, this can be achieved only by intubation of the patient. Occasional preliminary tracheostomy may be needed. Positioning of the patient must be decided upon and no change made without warning. Tubes and connections should be as firmly and as neatly fixed as possible with tape.

The surgeon should give notice when he is ready to begin. Once under way, the anesthetist or anesthesiologist, by close monitoring of the patient, may keep the surgeon posted concerning untoward events. The operator should also not be oblivious to all but his own immediate project. By anticipating hemorrhage, watching the color of the blood, warning of encroachment upon vital or near vital structures, he can be most helpful. If intra-orally, checking the endotracheal tube, as well as avoiding it, keeping the pharynx clear of blood and secretions, and also being responsible for packs within the airway, he can further protect the patient. At the completion of the procedure adequacy of the airway, as well as the patient's general condition, should be agreed upon.

Last but not least is the patient. Keep constantly in mind that this is not a lesion to be operated upon, but an individual with all the physical and mental complexities that this word implies. A wide gamut of type is present and each offers, in its own way, a challenge.

In general it may be of aid to utilize some category or categories. Two means of classification seem to present themselves. They are based on age and on the type of lesion. Somewhat less detailed than "the seven ages of man" is the following grouping: Neonatal or infant period, Childhood, and Adult life.

The statement that a child is not a small adult has no meaning unless some of the differences related to age are examined. The infant, child and adult all show variations not only of anatomy, but of physiology and psychology.

"At first the infant, mewling and puking in the nurse's arms" is quite a different creature from its counterpart of two or three decades later. The neonate's neck is short, his ribs are horizontal and inefficient for respiration. His temperature mechanism may readily go awry; he has a predilection to retain salt and water and his adrenals are of questionable value. He probably doesn't comprehend pain as we do, but if healthy, is not uncomplaining. As he grows, these gradually approach conditions of adult life. However, this is not a tranquil progression to maturity. The red count drops during the first twelve months and then usually begins to rise. Reasoning and fear develop, the latter becoming highly refined at age of five or so, and difficult to control.

The tumultuous teens with all their emotional problems soon follow. While all this is taking place, there is a steady procession of upper respiratory infection, contagious diseases and other afflictions. The other

side of twenty things may simmer down for a bit but then comes the inevitable deterioration of the machine which becomes creaky, with faulty plumbing and worn-out parts.

The type of lesions which confront one in plastic surgery may be divided into three main groups. They are congenital, acquired and malignant. Further determinants, which are productive of unrest, are whether these cases are emergencies, urgent or elective.

The congenital anomalies considered present few emergencies, except where respiration is affected. While it may be desirable to repair a cleft lip in the first few weeks of life, the lack of correction is not incompatible with life, no matter how salutary for other reasons. This permits adequate preparation and selection of the optimal time. It must be appreciated that a congenital anomaly requiring our attention is often associated with others of a serious nature.

Acquired defects may not be so kindly disposed. These may be either acute or their residuals. These problems are similar throughout life; although the younger ages seem to have a predilection for fire and intra-oral trauma. The acute injury is taxing to surgeon and the anesthesia department alike. They are always messy and do not permit a leisurely contemplation. Intra-cranial or associated distant injuries may have a profound effect upon the mode of attack. Blood loss with shock is often present and, most difficult of all, the airway may be dangerously compromised, either because of damage or accumulation of blood and debris. This must be cleared and maintained. A tracheostomy should be done without hesitation if needed.

The residuum of these acute episodes are often likewise perplexing. The resulting scars and skeletal deviations may make administration of anesthesia hazardous in the extreme. Ankylosed temporomandibular joints and severe burn contractions of the neck disturb the equanimity. Again very close cooperation between the surgeon and anesthetist, utilizing to the utmost their skill, are all that stand between the patient and catastrophe.

Malignancy, though a fearful word, presents a challenge, running through no greater variation than any other problem discussed. Its association, when extensive, with debilitation of the patient and encroachment upon vital structures create the difficulties. Here again careful planning and preparation of the patient are invaluable. The "en bloc" removal or destruction of the involved tissue often leaves minimal mechanisms for swallowing or breathing. This may lead to a very eventful recovery, if the greatest care is not taken throughout the procedure. Again, if in doubt, tracheostomy is the best sedative for all.

Some recognition must be afforded to those of us who march down the pharynx, cautery in hand. For the protection of life and property, this tendency should be anticipated.

SUMMARY

The anesthesia problems of head and neck plastic surgery arise from three individualized human elements — surgeon, anesthetist or anesthesiologist and the patient. The patient, though assuming a passive role, presents the challenge. It is for the first two to meet this together with intelligence and understanding. The

wonder is not that we get into difficulty, but how often in tense and trying circumstances things go so well. Perhaps the answer lies in the danger of complacency, of routine and lack of mutual understanding.

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Carbon Dioxide and Pulmonary Ventilation: Part 2

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EFFECT IN ANESTHESIA

We have just seen the effects of carbon dioxide on ventilation and other processes in normal man. What are the effects of carbon dioxide on ventilation under basal or general anesthesia? Because of their relative impotency when used alone without previous premedication or in conjunction with some other more potent agent, it can be said that nitrous oxide and ethylene are perhaps the only two general anesthetic agents that do not significantly affect carbon dioxide homeostasis within the human body. This is simply because when used alone they do not depress the respiratory center. Without premedication or other agents they will hardly produce anesthesia except when used in concentrations that result in lowered oxygen tension in the mixtures. That this is not true of our other anesthetic agents or the ancillary depressant drugs is obvious from a study of available clinical studies.

It has been known for some time that opiates and similar synthetic compounds alone almost invariably produce a rise in resting end-expiratory carbon dioxide and sharply decreases the ventilatory response to increases in carbon dioxide. Eckenoff, Helrich and Hege, reporting recently in the Surgical Forum and other investigators as well, studied the effects of morphine, demerol, dilaudid, codeine, methadon, nisentil, dromoran and nalorphine on the respiratory response to carbon dioxide. **Depression of the respiratory center to even elevated levels of carbon dioxide was demonstrated in all.** There was an average increase in alveolar pCO_2 of 6 mm. of mercury with a range of from 2 to 12 mm. mercury. Their results have led them to emphasize three points:

1. Duration of a single dose of an opiate may exceed 24 hours even though pain relief may disappear in a few hours.

2. The respiratory depressant effect may not be readily apparent except by careful observation. Decreased pulmonary ventilation may be present in spite of adequate respiratory rate.

3. Respiratory depression may persist even in spite of return of pain. Decreased pulmonary ventilation producing increased carbon dioxide levels may spell danger for the patient in a precarious state. They cite increasing evidence that respiratory acidosis may predispose to cardiac irritability, especially with cyclopropane and fluothane anesthesia, and other circulatory phenomena including the two extremes, hypertension and hypoten-

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Presented at the Nurse Anesthetist Workshop, Letterman General Hospital, August 26, 1960.

Part I was published in the June issue of the Journal.

sion as seen in "cyclo shock." They go so far as to question the standard procedure of giving opiates for premedication at all, in view of the fact that effects are prolonged and that anesthetic agents and the stress of surgery itself offer problems of their own. They advocate, as do others, the use of barbiturates for premedication instead, because of the apparent lack of depression of respiratory response to carbon dioxide when used in normal doses. Thiopental (pentothal) has been studied without and in combination with opiates. Although agreement is not 100 per cent, it has been demonstrated that pentothal in "normal" doses does not significantly alter the respiratory center responses to carbon dioxide.

Combined with opiates, relaxants, and other drugs its respiratory depressant ability has been conclusively demonstrated. In conjunction with pentothal anesthesia, there is evidence that increased carbon dioxide, if and when it occurs, causes decreased blood flow through the liver and in the experimental animal at least a prolonged effect from pentothal and other barbiturates used for anesthesia has been demonstrated. Recent work has shown that the new non-opiate drug phenazocine (prinadol) is almost identical to demerol in its depression of alveolar ventilation and decreased sensitivity to increased carbon dioxide concentration.

Without going into detail, a more recent vogue has become apparent. This is the administration of so-called opiate-antagonists in combination with opiates to prevent respiratory depression. All of these have been shown to be respiratory depressants in their own right. Chemically, they all resemble the opiates, and even though in certain optimal combination with an opiate may produce respiratory stimulation of sorts or decrease the level of apparent depression, after the initial brief period of stimulation their depressant effects may be additive. This view is not shared by all, however.

Ethyl ether, whether combined with opiate premedication or not, when prolonged and unassisted, leads to respiratory acidosis by depression of the respiratory center. It also alters the mechanics of pulmonary ventilation by its action on respiratory muscles. It seems that the tendency for this to occur may be greater in the closed system. Under these circumstances, an excessive volume of assisted ventilation may be required to reverse respiratory acidosis. This may be due to incomplete carbon dioxide absorption, incompetent valves, increased external dead space or possible aerodynamic sources of carbon dioxide rebreathing. In the lighter planes of surgical anesthesia the respiratory center is said to be capable of maintaining alveolar ventilation at adequate levels to prevent marked changes in carbon dioxide homeostasis, although in planes 3 and 4 without assisted respirations, respiratory acidosis almost invariably occurs even when no premedication is used and without assistance. It is interesting that ether anesthesia produces an increase in oxygen consumption and thus carbon dioxide production, presumably all secondary to the epinephrine release.

It has been shown by many that opiates such as morphine or demerol can decrease rather markedly the carbon dioxide production by the body. Because of their primary effect on

the respiratory center and summation of respiratory depression with added anesthetic, accumulation of alveolar carbon dioxide occurs unless ventilation is assisted faithfully. The augmentation of respiration primarily in rate at the expense of tidal volume noticed with ether anesthesia may be primarily a result of stimulation of the stretch receptors within the lung itself and not primarily due to respiratory center stimulation, as some believe. In the open chest with ether, or any other agent, because of altered respiratory mechanics and packing of lung tissue, deficient ventilation results over and above that imposed by the drugs used. An inordinate degree of assisted ventilation must be accomplished under these circumstances to maintain carbon dioxide at normal levels. In conjunction with this, some investigators insist that the lateral chest position is conducive to hypoventilation and respiratory acidosis.

With cyclopropane anesthesia, without added drugs, it has been shown by Jones and others that there is a progressive reduction in alveolar ventilation as the concentration of cyclopropane increases. Hypoventilation is thought to be brought about by decreased intercostal muscular activity. The respiratory rate increases as the depth of anesthesia becomes greater but is insufficient to compensate for the lowered tidal volume. This may be due to stimulation of pulmonary stretch receptors, as with ether.

However, the medullary respiratory center may be making an attempt to maintain normal pCO_2 in the absence of intercostal muscle activity. Morphine given to patients undergoing cyclopropane anesthesia fails to increase rate of respiration.

Evidence has been accumulating in the scientific literature that cyclopropane can enhance the response of various structures, including the myocardium, to the action of catacholamines. The bizarre cardiac arrhythmia reported with cyclopropane and epinephrine-like substances almost do not occur when carbon dioxide levels in the body are maintained at normal levels by assisted ventilation. This is a fact of considerable importance.

Those who use fluothane should be aware, too, that not only does this agent cause myocardial depression by a direct effect on the heart, the degree of which being proportional to the concentration used, but also, that fluothane is itself a powerful respiratory depressant drug. It causes early decreased tidal and minute volumes even with the increased rate so often noticed. Use of this agent almost demands respiratory assistance. As with cyclopropane, fluothane is said to sensitize the myocardium to epinephrine-like compounds (though fluothane does not increase these in the body as does ether and cyclopropane) and may cause cardiac arrhythmias. Again, evidence indicates that these arrhythmias usually do not occur when ventilation is adequate to maintain normal carbon dioxide levels. Little need be said of the effects of anesthetic techniques using muscle relaxants which are rarely used without depressant drugs. The relaxants produce severe alterations in respiratory mechanics resulting in decreased alveolar ventilation even without depressant drugs.

From the foregoing, it is fairly obvious that the common denominator of general anesthesia is some degree of respiratory depression. This leads

to carbon dioxide accumulation and significant alteration in acid-base balance if pulmonary ventilation is not artificially supported, etiher by the anesthetist or mechanical ventilators. Other, more mechanical, aspects of anesthesia that contribute in an additive manner to carbon dioxide accumulation in patients, whether depressed or not, are also important in anesthetic management of the respiratory system. Included here and contributing are: patency of the airway, degree of dead space in masks and tubes which is of especial importance in children, resistance in machines (fatigue), competency of valves, effectiveness of absorbent, certain aerodynamic sources or channeling through carbon dioxide absorber from faulty charging, and positioning on the table.

SUMMARY

Carbon dioxide is a gaseous waste resulting from normal body metabolism. Because of its unique nature it lends itself to excretion by way of the lungs. The process by which this is accomplished is a delicate one and normally efficient in maintaining the internal environment of the body. The respiratory system, with its inherent ability to detect increases or decreases in the carbon dioxide circulating in the blood normally is capable of responding to restore the level toward normal. Anything that interferes with this attempt to regulate may produce changes within the body that may cause severe alterations not only in respiration and circulation but in metabolism.

That these derangements may be of serious consequence is well noted in medical and anesthetic publications. Who, then, should be more conversant with this knowledge than the anesthetist? Who works more closely with the respiratory system? It is absolutely necessary to realize that not only do the apparatus and techniques influence pulmonary ventilation but also that few, if any, of the agents used are not direct depressants of the respiratory system. To avoid the consequences of increased carbon dioxide accumulation and its own additive narcotic properties it is not enough to know that it can happen. Indeed it does, and more often than we might imagine. Each of us by being more alert, less complacent, ever-critical of our techniques, and more diligent in our efforts to assist and maintain adequate alveolar ventilation will contribute significantly to the welfare of the patients under our care.

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Anesthesia Management for Patients Receiving Cortisone

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The cells of the adrenal cortex, under the influence of the adrenocorticotrophic hormone (ACTH) of the pituitary gland, produce three important hormones: 1. The mineralo-corticoids, 2. the gluco-corticoids, 3. the sex hormones.

The gluco-corticoids, in relation to anesthesia, are the subject of this work. The gluco-corticoids are more familiar to the anesthetist as hydrocortisone and cortisone. Hydrocortisone is the main natural product of the adrenal cortex, and is about 4/5 as potent as cortisone. Both steroids are now produced synthetically. Among other actions, the steroids stimulate the formation of antibodies and gluconeogenesis (conversion of no-sugars to carbohydrates) and inhibit the reaction to inflamation.

The stress of anesthesia and operation in otherwise normal patients causes a series of disturbances among which are: retention of sodium and chloride, oliguria, catabolism, polymorphonuclear leucocytosis, fall or rise in plasma corticosteroid level, lymphopenia and eosinopenia.

These changes, according to Wylie and Churchill-Davidson,[5] continue for many hours, usually 48 hours after consciousness has been regained. They sustained that a normal patient will respond to these changes in a normal manner, but a patient with a disease of the pituitary or adrenals, or a patient under the effects of previous hormone therapy, can upset the equilibrium and specific treatment may be urgent, if the patient is to recover and survive.

The normal physiological output of the adrenal cortex is about 20-25 mgs. of cortisone a day. When larger doses than those have been used in the therapeutic treatment of patients, this may lead to suppression of the gland's function, due to the decreased secretion of the adrenocorticotrophic hormone by the anterior pituitary gland, and eventually leads to adrenocortical atrophy. This effect may last as long as a year or more. It has not been determined how long it may take for recovery of adrenal function after cessation of therapy. It has been said that, not necessarily this effect follows heavy or prolonged treatment with cortisone. A week of treatment may be long enough.

The response of a patient to the stress of anesthesia and operation

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Presented at the annual meeting, Southeastern Assembly of Nurse Anesthetists, Memphis, April 20, 1961.

may be inadequate and acute adrenal insufficiency may occur.

Within one or two minutes of the administration of hydrocortisone to the intact animal, the release of ACTH may be inhibited. Treatment with cortisone may result in cortical atrophy as severe as that following hypophisectomy, and withdrawal of steroids may be followed by adrenal crisis. The symptoms usually take place in the immediate postoperative period, but may occur during the operation. It is characterized by sudden severe hypotension, shock, coma, and anuria. It should be suspected when sudden circulatory failure responds poorly to treatment with intravenous fluids and vasoconstrictors in the absence of sudden massive blood loss.

There are several tests for adrenocortical function which have brought great enthusiasm and also have been abandoned for lack of accuracy. They all can be used as a guide of the status of the gland. The more popular are the 17 hydroxycorticoids (depending upon renal function) and the eosinophil count. Following stress, a blood smear showing no eosinophils is the normal finding. It is a sign of increased cortical activity. A count above 300/mm3 suggests Addison's disease or an allergic reaction; counts below 50 suggest adrenal activity.

The injection of ACTH provides a gross index of cortical response. This is not specific reaction, since it may occur in the adrenalectomized animal in response to the injection of adrenaline alone. The best test for the anesthetist is the reaction of the patient to the anesthesia and operation.

Pre-anesthetic medication, when heavy, may result in definite cortical change. Morphine may block the release of ACTH at the hypothalamic level, and the barbiturates are depressive to cortical activity. But small quantities of pre-anesthetic medication are not significant in the response of the adrenal cortex to anesthesia. Adequate spinal anesthesia depresses adrenocortical function and also blocks the sympathetic-medullary system proportionally to the level attained to meet the requirements of the operation. Ether and cyclopropane, to a lesser degree, stimulate the cortex, and the levels of corticoids in adrenal venous blood and peripheral blood have been found elevated in most studies during ether anesthesia.

The problem of anesthetic care in those patients with possible adrenal insufficiency can be reduced then, in the practical observance of two principles: 1. To keep in mind that any patient who is receiving or has received steroids at any time during a period of six months to a year, for a length of time of a week or more, should raise the possibility of an adrenal insufficiency. 2. To have a schedule of maximum and minimum doses of cortisone for prophylactic treatment of these patients.

In addition to those individuals who have received steroids, adrenal deficiency should be suspected in: 1. Patients on anticoagulant therapy (because of the possibility of adrenal hemorrhage). 2. Patients with (a) Addison's Disease, (b) amyloid disease, (c) disseminated tuberculosis, (d) long-standing gastrointestinal disease, (e) sepsis and, (f) chronic nephritis.

One way of management is to give doses which are comparable to those of a normal gland in response to trauma, based on the evidence that a severe stress causes the adrenal

gland to secrete the equivalent of 400 mgs. of hydrocortisone daily. This schedule gives 100 mgs. every 8 hours on the day of surgery, reducing it gradually the next several days, and giving ACTH the last two or three days, together with the cortisone. A patient receiving 25-75 mgs. per day by mouth, treated for true adrenal insufficiency, will require twice this much in an elective operation, while a patient on high doses of 300-500 mgs. a day for several months has built a tissue habituation and needs larger doses of steroids, 800-1,000 mgs., on the day of surgery.

A good schedule to follow is that of Gillies[1] who gives 200 mgs. of hydrocortisone the day before surgery; 100 mgs. the day of the operation, just before premedication; 100 mgs. in each 500 cc. of blood, or fluids, during the operation; and 100 mgs. at the end of surgery, followed by a withdrawal schedule given in Table 1.

Table 1.

AFTER OPERATION DAY	HYDROCORTISONE mgs.*	ACTH
1	50	15 mgs. in liter of 5% dextrose and water
2	40	15 mg. IM 4 times
3	30	15 mg. IM 3 times
4	20	15 mg. IM 2 times
5	10	15 mg. IM 1 time
6	0	None

*Given intramuscular every 6 hours.

Tarrow[6] recommends that all patients who have had systemic cortisone for more than two weeks within two years prior to surgery, should be prepared with cortisone prior to anesthesia, usually 200-400 mgs., with partial preparation of 100 mgs. before surgery, and further injections during the operation.

Bayliss[4] recommends that if collapse occurs, an additional 100 mgs. be given intravenously and repeated if necessary. If hypotension is not corrected quickly, 2 to 4 mgs. of norepinephrine is added to the infusion.

In conclusion, it must not be forgotten that to maintain circulation, adrenocortical hormones must act on the peripheral vessels, together with catecholamines and various electrolytes. Most patients show normal adrenocortical response, but for some reason, require excess hormones in cases where the hypotension is due to diminished blood volume or loss of sodium or potassium, or other causes. In these situations the patient may need an excess of hormones, but of both adrenal medullary and adrenal cortical types. Therefore, in a patient who develops hypotension in the postoperative period, we must have in mind hemorrhage, infection, atelectasis, pneumothorax, transfusion reaction, heart failure, and loss of fluid. In these patients, hydrocortisone is not effective unless used with sympathomimetic drugs, desoxycorticosterone acetate, digitalis, or additional salt.

One more difficult situation to be presented to the anesthetist is what to do if a patient is on cortisone therapy and starts to bleed from an ulcer, and is brought to the operating room. Cortisone must be temporarily continued, or increased, to cover the

(Continued on page 236)

Blood Pressure:

Principles and Management

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It was not until Riva-Rocci, Janeway, Rogers, Hales and Poiseuille in the early 1800's and Korotkow in 1905 developed the auscultatory method of sphygmomanometry that a way was available to monitor patients. John Snow first documented, well and completely, the signs and symptoms of anesthetic death under chloroform anesthesia in England in 1848.

The problem of death under anesthesia has been under investigation for years and gradually a fund of knowledge has been accumulated. Some misinterpretation has occurred because there exists in any anesthesia a profound and complex interaction of systems that tend to maintain homeostasis.

Blood pressure as we now commonly accept it is the resultant of five factors. These are: A pump (heart), blood volume, peripheral resistance plus elasticity and viscosity. The latter two factors we must more or less accept "as is" in a particular patient. The first three can be varied in many ways for better or for worse.

The pump can vary greatly in effectiveness and it is difficult to anticipate or measure the reserve that is present. Perhaps we all recognize the patient who, when 40, had a systolic blood pressure of 160 and at 80 has a systolic blood pressure of 120. This is perhaps an indication of lost reserve. It is a common practice, though not completely correct to use blood pressure as an indication of cardiac output (CO) peripheral resistance or blood volume. It is an indirect measurement dependent on three to five variables.

$$PP \times HR = V.C.E.$$

$$PR = \frac{MABP}{CO \text{ in liters}}$$

Pulse Pressure × heart rate =
Ventricular Contractible energy
varies from 1000-8000
Average about 2800

or

$$\text{Peripheral Resistance} = \frac{\text{Mean Blood Pressure}}{\text{Cardiac output in liters}}$$

Normal = 15-30 units
Average 20 units

Cardiac output depends upon the stroke volume and the rate. As a result the cardiac output can vary considerably as a result of rate change alone. If a normal stroke volume of 60 cc. is present at a rate of 80 then CO = 4800 cc. If, as during a splanchnic reflex situation, the rate falls to 60 and the diastolic filling remains

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*Director, Department of Anesthesiology, Cincinnati General Hospital.

Presented at the annual meeting, Ohio Association of Nurse Anesthetists, Columbus, April 5, 1961.

60 cc. then the cardiac output could be 3600 cc./min. and it would now be possible that the blood pressure would be lower than when the heart beat was 80/min. If, as a result of atropine, temperature stress, CO_2 retention or other causes, the heart rate gets to 100, then with the same stroke volume of 60 cc., a 6000 cc. output might be able to manifest an elevation in the blood pressure. Now if the rate should get to 120/min. then the diastolic filling time might not allow stroke volumes of more than 40 cc. per beat. $CO = 120 \times 40 = 4800$ cc. or at higher rates the stroke volume may be lower $CO = 160 \times 20 = 3200$ cc. and the resultant blood pressure not elevated—this is forward failure.

Starling's law is working in a situation like this and the strength of myocardial contraction can be varied, especially decreased, as shown by Price, Brewster and Brodie, by studying various anesthetic agent effects on myocardial strength.

All agents reduce the strength of myocardial muscle when stripped of catechol amine levels and effects.

Several ions are always at work affecting myocardial tone: 1. Na—rhythmicity, 2. K—diastolic arrest, 3. Ca—systolic arrest. Ordinarily, administration of Ca^{++} will bring about a rise in blood pressure, will augment digitalis effect and will counteract the K^{+} effect and citrate binding effect on the circulation. This has been noticed for years when calcium is used in treating multiple transfusion effects or in treating cardiac arrest.

We have been using $CaCl_2$ prophylactically without always awaiting a dire emergency for the support of blood pressure and the improvement of myocardial tone.

Blood volume is a two-faced card —it implies a certain number of liters of circulating blood volume and also a container of certain capacity. In normal young adult life the container and the contents are about equal. In senility or geriatrics the container is contracted as is the nutritionally deficient blood volume. Yet under the influence of anesthetic agents, the container can relax and accommodate a greater volume. The vascular bed once developed to best weight size never goes away and can be very easily made available for the internal exsanguination of the anesthetized patient.

Several techniques are available and are clinically useful in determining whether another pint of blood can be tolerated or a phlebotomy is in order. These are the Evans Blue Blood Volume determination or the Radioisotope-tag determination comparing *predicted volumes* of best weight with *determined volumes* and making the appropriate readjustments. Though the errors may be 5 per cent, $0.05 \times 5000 = 250$ cc., it does not obviate the clinical usefulness of the determinations.

Another way of keeping an eye on blood volume (tank and contents) is to note the venous distention at various times during a case. Remembering that for all practical purposes congestive failure cannot exist unless venous distention also exists. Replacement of volume is thus allowable until adequate venous pressure is returned.

The only true replacement for lost blood is blood. Patients can withstand the loss or gain of a pint of blood from normal status without difficulty

FACTORS AFFECTING BLOOD PRESSURE

	Hypertension	Hypotension
	Pituitary hypothalamic lesion Post pituitary Cushing's disease Toxemia Pitressin	Simmond's disease Hypophysectomy Post steroid depression
Thyroid	hyperthyroid	Myxedema
Parathyroid	adenoma	Excision of parathyroid glands
Lungs	CO_2 retention Respiratory acidosis as in emphysema or as in edema	Low CO_2 High sustained intrathoracic pressure Pulmonary emboli Increase in pulmonary resistance
Heart	Cardiovascular Certain drugs	Infarction Bradycardia Extreme tachycardia Agent depression
Adrenals	Cushing's disease Pheochromocytoma	Addison's disease Postadrenalectomy Post steroid therapy Post hypophysectomy
Kidneys	Renin Hypertensinogen Goldblatt	Potassium retention
Sympathetic	Catechol Amines	Rauwolfia, Ganglion Blockers
Others	Succinylcholine Mechanical Reflex	K^+ My^{++} Nitroglycerine Mechanical, toxins, temperature Reflex

and, providing perfusion continues and oxygen carrying capacity remains within a certain range, then survival will be the rule.

Weighing sponges is useful, figuring 1 cc.=1 gm. However, a rough sponge count can be likewise an intelligent guess in estimating blood loss overall, 20 cc. per lap sponge used will give a pretty close estimate.

It has been shown a number of times in hip fractures that the patient usually arrives in the operating room with about a 1500 cc. blood volume deficit: 500 cc. in the fracture hematoma, a 1000 cc. deficit because of a tea and toast diet, and post trauma dehydration.

Shock is present when the blood volume is altered 30 per cent

$$\begin{array}{r} 5000 \text{ cc.} \\ .30 \\ \hline 1500.00 \text{ cc.} \end{array}$$

Now peripheral resistance is the last variable of the functions that contribute to the resultant known as blood pressure. This is the area that

always gets the most attention and probably justifiably. So to try to set it up in a slightly different way, I would like to ask, "What are all the possible things that normally or abnormally, endogenously, or exogenously, influence peripheral resistance during anesthesia?"

Outline for treatment:

Treat according to scheme.

Treat mechanical things first.

Use drugs specifically, not merely as rule of thumb.

Symptomatic therapy will work, is often necessary and gives time to assess the cause, thus allowing treatment directed at the cause.

Diagnostic efforts are always worthwhile. These may include EKG, and blood chemistry determinations.

Consultation intelligently sought is never out of order.

SUMMARY

Blood pressure depends on: 1. Cardiac output, 2. Blood volume, 3. Peripheral resistance, 4. Elasticity of the great vessels, and 5. Viscosity of the blood.

A therapeutic framework is proposed within which rational therapy is possible.

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Hospital Safety

Harriet L. Aberg, C.R.N.A.

We have been asked about the advisability of removing flammable anesthetics from the anesthesia apparatus if cautery or electrosurgical units are to be used. If it is known positively that there is no leak from a cyclopropane cylinder or ether vaporizer or any other flammable agent container, it is possible to presume that there is no danger of fire or explosion. However, if any doubt is entertained, surely in the interests of patient and personnel safety, containers of flammable materials should be removed from the room if cautery or electrosurgery units are to be used.

If the containers and anesthetics are removed, where should they be put? It would seem that outside the room involved would be sufficient. Care must be exercised of course, so the cylinders or vaporizers can not be tipped over or dropped while off the apparatus.

N. F. P. A. #56 does not specifically state whether flammable anesthetics must be removed from the apparatus when cautery or electrosurgical units are to be used, just that a nonflammable anesthetic should be chosen. It is left to the good judgment of those involved to choose safely. Constant vigilance is required of those working in anesthetizing locations whether these are operating rooms, delivery rooms, outpatient departments, emergency rooms, clinics, doctor's offices or other.

A related question is what to do when a flammable anesthetic is being administered and the surgeon feels the use of cautery or an electrosurgical unit is necessary? Will merely switching to a nonflammable agent be safe? How long should the patient be ventilated with nonflammable mixtures? There are no definite answers. It will depend greatly on the length of time and amount of flammable anesthetic which has been given. There is no sure test which will give positive proof. However one test has been devised that seems to have merit, that is to remove from the patient's mouth, a 10 or 20 cc. syringe full of air, take it to another area and see if it will ignite. It will be interesting to note in years to come whether this danger continues or whether the halogenated agents come into wider use and bypass this hazard. This can not be predicted accurately at present.

Miss Aberg is A.A.N.A.'s representative on the N.F.P.A. Committee on Hospital Operating Rooms.

Any questions pertaining to hospital safety may be directed to the Executive Office. Answers will be included in this section in future issues.

Insurance

Insurance Costs?

In the May issue of the NEWS BULLETIN we illustrated the actual cost of Major Hospital in relation to the benefits. Let's take a closer look at the *cost* of the Group Income Protection (Accident and Health) Plan.

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Insurance Consultant

*It is only fair to explain that this interest figure is for the use of the $7,600 Sickness Fund only. There is no interest calculated for the lifetime Accident Benefits, partial Disability Benefits, Waiver of Premium Benefits, or Death Benefit. If, for instance, a member collects under the Accident Provision for 10 years, the total payment to the member would be $48,000. The interest charge would be infinitesimal.

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8-61

Abstracts

Galicich, J. H.; French, L. A. and Melby, J. C.: Use of dexamethasone in treatment of cerebral edema associated with brain tumors. Journal-Lancet 81: 46-53 (Feb.) 1961.

"More clear-cut evidence of the efficacy of glucocorticoids in relieving symptoms generally attributed to cerebral edema came as a result of treating 2 patients having recurrent glioblastomas with large doses of dexamethasone but without surgical decompression. . . .

"Fourteen patients with increased intracranial pressure as a result of brain tumors were treated with dexamethasone, a potent synthetic glucosteroid, to determine its effect on localized cerebral edema. Of the 14 patients, 13 showed dramatic improvement as evidenced by relief of signs and symptoms of increased intracranial pressure and decrease in neurologic deficit. In 2 cases, angiographic proof of decrease in the size of the intracranial mass was obtained.

"Improvements in these cases is undoubtedly a result of decrease in the edema surrounding the tumor and illustrates the surprisingly great contribution of localized cerebral edema to the neurologic deficit in such patients. It is our impression that patients receiving glucocorticoids before or immediately after surgery generally have an unusually benign postoperative course.

"With the exception of 1 possible case of gastrointestinal bleeding, no detrimental complications attributable to dexamethasone therapy were observed. . . . It is concluded that treatment of localized brain edema with dexamethasone is safe and highly effective."

Duncalf, Deryck and Jampel, R. S.: The action of d-tubocurarine on the extraocular muscles in strabismus. Arch. Opth. 65: 366-368 (March) 1961.

"Since the extraocular muscles are more sensitive to d-tubocurarine than other somatic muscles it occurred to one of us that this drug might be used to evaluate patients with different types of oculomotor imbalance. In our study of the literature we found this idea had been previously expressed by Drucker et al. It seemed possible that d-tubocurarine could produce changes in eye movements which might be characteristic of various types of heterotropia. The addition of this approach to generally used techniques of evaluation of heterotropia could lead to a more complete clinical analysis as well as data of theoretical value. . . .

"A group of 26 patients, 12 males and 14 females, about to have corrective surgery of the extraocular muscles for strabismus was included in the present study. The age of 22 of these patients ranged from 6 to 13 years. The remaining 4 were adults. . . .

"The intravenous injection of d-tubocurarine in 26 patients with strabismus did not appear to add clinically significant data. In complete d-tubocurarine-induced opthalmoplegia the eyes assume a position of rest of 15 to 25 degrees of diver-

gence with no upward deviation. The eye muscles appear to undergo a distinct pattern of progressive paresis following the intravenous injection of d-tubocurarine in divided doses. In overlapping time sequence this pattern is as follows: (a) ptosis, paralysis of upward gaze and convergence, (b) paralysis of lateral gaze, (c) paralysis of downward gaze."

Meyer, J. A.; Blumenstock, D. A. and Berry, F. B.: Procainamide hydrochloride in ventricular defibrillation. Arch. Surg. 82: 488-492 (March) 1961.

"Widespread interest among surgeons and physicians in the techniques of cardiac resuscitation has elevated these procedures to a level of universal acceptance. . . . There is one specific area in this field, however, which we feel has not received sufficient emphasis or recognition. A certain vagueness remains in many published recommendations of the steps to be taken in regard to the use of drugs as adjuncts to resuscitation. . . .

"Evidence is available throughout . . . pioneering studies that the administration of epinephrine during resuscitative efforts may tend to perpetuate the arrhythmia. . . . On the other hand, procainamide appears to be a useful adjunct to defibrillation by countershock, and it may frequently render a refractory arrythmia controllable. [In] three recent clinical cases . . . successful defibrillation followed the administration of this agent—2 of which patients made good recoveries and were discharged from the hospital. The authors . . . concede the lack of validity of these 3 cases as a series, and can say only that in each such case, defibrillation immediately followed the use of the drug."

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Legislation

Emanuel Hayt, LL.B., Counsel A.A.N.A.

Blood Transfusion Is Sale If Hospital Expressly Warrants Fitness of Blood or Plasma for Patient

It is alleged that the individual defendants were authorized by the hospital to render medical services and perform all necessary functions pertaining to preoperative, operative and postoperative procedures; that the defendants employed, managed, controlled and supervised all of the personnel in and about the hospital who had any contact with or rendered services to plaintiff's intestate; that in July and August, 1957, the plaintiff's intestate received advice and treatment from the defendant hospital and the others relative to severe abdominal pains, and was advised to have an operation; that all of the defendants represented themselves to be competent to perform the professional work required; that an operation was performed; that following the operation, the plaintiff's intestate suffered great pain and eventually died therefrom; that such death was caused by the negligence of all of the defendants in failing to properly diagnose and treat the illness, and in negligently and wrongfully administering blood transfusions improperly and of improper quality.

The fourth cause of action, however, states in addition to the foregoing, the following: "* * * with the hiring by plaintiff and plaintiff's intestate of the individual defendant doctors * * * and upon the hiring by plaintiff and plaintiff's intestate of the defendant * * * hospital * * * each of the defendants named herein warranted to plaintiff and plaintiff's intestate that the operation to be performed and performed and the blood transfusions administered and to be administered to plaintiff's intestate by the defendants * * * would help to cure her and further warranted that the blood plasma or whole blood, or whatever substance it was that was injected into plaintiff's intestate was fit for her and that the said transfusions would not be harmful to plaintiff's intestate * * *." It is then alleged that by reason of the subsequent events the plaintiff suffered damages; that such damages were caused by the breach of the two warranties.

The moving defendants argue that "the law is well settled that there can be no cause of action for breach of warranty where there has been no sale." That premise is based upon Perlmutter v. Beth David Hospital (308 N.Y. 100). The facts therein indicate that during the course of treatment "bad" blood was supplied by the hospital to the plaintiff as part of the customary services rendered by the hospital to its patients. No allegations of negligence are alleged, but the complaint "* * * rather seeks recovery upon the theory that the supplying of blood constituted a

sale within the Sales Act and that, as a consequence, there attached implied warranties imposed by that statute that the blood was 'reasonably fit for (the) purpose' for which required and of 'merchantable quality' (Personal Property Law, section 96, subdivs. 1, 2)." As in this instant case, the defendants therein moved for judgment under Rules 106 and 112. The court there said (page 104): "The answer to that question turns upon whether the transaction described in the complaint constitutes a sale under the Sales Act, whether, in other words, there was created a vendor - vendee relationship between defendant and plaintiff." In reaching the conclusion that the complaint should be dismissed, the court said that the contract involved therein is clearly one for services, and just as clearly, not divisible. "Concepts of purchase and sale cannot separately be attached to the healing materials —such as medicines, drugs or, indeed, blood — supplied by the hospital for a price as part of the medical services it offers. That the property or title to certain items of medical material may be transferred, so to speak, from the hosptial to the patient during the course of medical treatment does not serve to make each such transaction a sale. * * * It has long been recognized that, when service predominates, and transfer of personal property is but an incidental feature of the transaction, the transaction is not deemed a sale within the Sales Act. * * * (p. 104). While determination, as to whether the essence of a particular contract is for the rendition of services or for the sale of property, may at times be troublesome and vexatious, there is no doubt that the main object sought to be accomplished in this case was the care and treatment of the patient. The supplying of blood by the hospital was entirely subordinate to its paramount function of furnishing trained personnel and specialized facilities in an endeavor to restore plaintiff's health" (p. 106). The court went on to say in words peculiarly applicable to the case at issue herein: "It was not for blood— or iodine or bandages — for which plaintiff bargained, but the wherewithal of the hospital facilities to provide whatever medical treatment was considered advisable."

Aside from the rather technical observation that a motion under Rule 106 is not maintainable where only part of a cause of action is defective while the other part does state a cause of action, there are other reasons for denying the motion. The Perlmutter case was based upon the theory of implied warranty under section 96 of the Sales Act.

In the fourth cause of action of the complaint herein, it is claimed that the defendants expressly warranted to the plaintiff and the plaintiff's intestate the subject matter of the claimed contract. That question of express warranty was not passed upon in the Perlmutter case. It is my opinion that parties can contract with respect to any valid subject matter and bind each other thereto. At least insofar as the complaint itself is concerned, in view of the fact that the allegations thereof must be deemed to be true for the purpose of the motion to dismiss, the court must give every fair intendment to the pleading and construe it in favor of the plaintiffs. It is sufficiently pleaded to indicate the contention of the plaintiffs to be that express warranties were

(Continued on page 236)

Book Reviews

Psychiatric Nursing. By Ruth V. Matheney, R.N., Ed.D., Director, Department of Nursing, Bronx Community College, New York, N. Y., and Mary Topalis, R.N., B.S., M.A., Chairman, Department of Nursing, Fairleigh Dickinson University, Rutherford, N. J. C. V. Mosby Co., St. Louis. Cloth. 281 pages. Indexed. 3rd ed., $3.75.

The opening chapters of this third edition lay a groundwork for psychiatric nursing by spelling out the role of the nurse in the care of the psychiatric patient and by a review of the development of "normal" personality. The nurse-patient relationship and basic principles for dealing with persons who have deviations of behavioral patterns are presented in some detail. Some of the more common forms of psychiatric conditions are treated in separate chapters. The rapid change in the care of persons with mental illness is pointed out as a bright future for nurses who care for these patients. An appendix gives a condensed classification of mental illnesses. There is a glossary and a brief index.

An Outline Guide for the Care of Postoperative Cardiac Patients. By Merle E. White, R.N., Cardiac Recovery Room Nurse, The Johns Hopkins Hospital, Baltimore, Maryland. Charles C Thomas, Publisher, Springfield, Ill. Cloth. 108 pages, 14 figures. Indexed. 1961. $6.00.

With the rapid increase in cardiac surgery during the past several years, the need for an outline for nursing procedures was imperative. Beginning with the preparation of the postoperative unit for the cardiac patient, the author has presented the necessary information in outline form with pertinent illustrations and line drawings. Equipment and treatments and nursing procedures are each spelled out. The respective duties of different personnel in the postoperative unit, specific treatments for cardiac emergencies and the various operative procedures and their special postoperative problems, are outlined in clear detail. The concluding item in the outline is the very optimistic report on the outcome of 285 open heart operations with 236 living patients.

Newer Dimensions of Patient Care. Part 1. The Use of the Physical and Social Environment of the General Hospital for Therapeutic Purposes. By Esther Lucile Brown, Ph.D. Russell Sage Foundation, New York. Paper. 159 pages. 1961. $2.00.

The first of three publications, this monograph presents a plan for caring for persons in general hospitals, with consideration of the social and psychological phases of hospital care. Developing the theme that patients are people in trouble, patient care based on the reactions of people to their problems is a major subject of the book. A plea for adoption of the method of individual attention rather than strict rules is made to hospital administrators as well as others who deal with the patient. Suggestions for admission procedures, record keeping, visiting, and self-help by patients are among the many subjects presented.

Resuscitation of the Unconscious Victim. A Manual for Rescue Breathing. By Peter Safar, M.D., Chief, Department of Anesthesiology, Baltimore City Hospitals; Assistant Professor of Anesthesiology, The Johns Hopkins University School of Medicine; Clinical Associate Professor of Anesthesiology, University of Maryland School of Medicine, and Martin C. McMahon, Captain, Baltimore Fire Department Ambulance Service. Charles C Thomas, Publisher, Springfield, Ill. Paper. 87 pages, illustrated. 2nd ed., 1961. $2.00.

Designed for use by persons who teach first aid, the text is limited to a description of technics for providing air to persons who have stopped breathing. Other phases of first aid such as the treatment of hemorrhage or fractures are not included. With the aid of line drawings, methods for providing an adequate airway and for the introduction of air or oxygen into the respiratory tract, are spelled out in detail. A list of aids for teaching this subject of resuscitation, a glossary, and a bibliography are included. Tear out sheets are provided for posting the basic principles of breathing for the unconscious patient, and for closed chest heart massage. Warnings are given for persons who are not trained in certain technics.

Essentials of Neurosurgery for Students and Practitioners. By Sean Mullan, M.D., Associate Professor of Neurosurgery, The University of Chicago. Springer Publishing Company, Inc., New York. Cloth. 273 pages, 87 figures. Indexed. 1961. $6.75.

Written to provide a framework of neurosurgical knowledge primarily for medical students this book has much information that will be of value to nurse anesthetists. Using drawings to illustrate radiological variations in the anatomy of the nervous system, and a description of the procedures for making x-ray tests, as the first chapter in the book, a groundwork is laid for better understanding of the remaining chapters. The surgical management of tumors, pain, injuries and other diseases of the nervous system is spelled out. Problems of pediatric neurosurgery, aneurysms, the paraplegic patient, psychosurgery and infections are among other subjects developed. The concluding chapter is a brief history of neurosurgery.

Introduction to Physiological and Pathological Chemistry. By L. Earle Arnow, Ph.G., B.S., Ph.D., M.B., M.D., President, Warner-Lambert Research Institute, Morris Plains, N. J., and Marie C. D'Andrea Logan, Assistant Director, St. Vincent's School of Nursing, Indianapolis, Ind. C. V. Mosby Co., St. Louis. Cloth. 490 pages, figures and tables. Indexed. 6th ed., 1961. $5.50.

This sixth edition has incorporated many of the newer developments in chemistry as they apply to the clinical problems confronting nurses. Of special interest to anesthetists will be the chapters on chemistry of the blood, hormones, cylic organic compounds, aliphatic organic compounds and the introduction to organic chemistry. The appendix contains such varied information as the international atomic weights, and a five page table listing the precious stones.

Introduction to Laboratory Chemistry, a spiral bound, paper covered manual with 150 suggested experiments was designed to accompany the 6th edition of the Introduction to Physiological and Pathological Chemistry. The tests are outlined in such a manner, however, that it is not essential that the original book be used. Questions follow each of the experiments.

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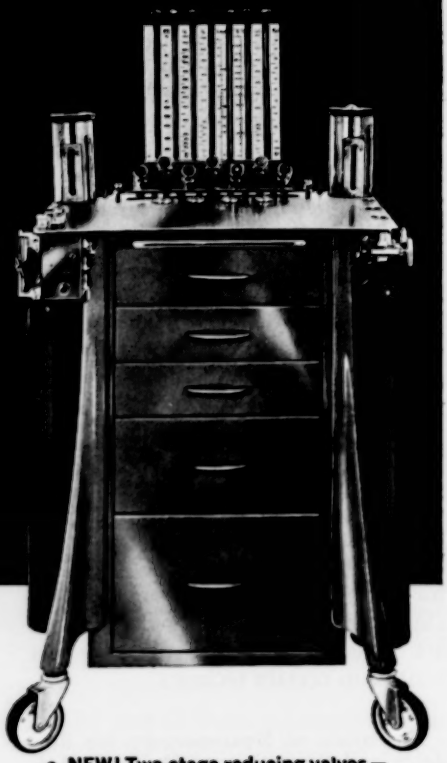

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Marie A. Bader (Martland Medical Center, Newark, N. J.): Graduate of All Souls Hospital School of Nursing, Morristown, N. J.; graduate of Mary Immaculate Hospital School of Anesthesia, Jamaica; member of AANA in good standing since 1941; secretary-treasurer, president and member of committees of New Jersey ANA; member of committees of Middle-Atlantic Assembly of Nurse Anesthetists; member, AANA Board of Trustees, 1953-55; member, various AANA committees, 1951-58.

VICE PRESIDENT

Joseph P. McCullough (Sartori Memorial Hospital, Cedar Falls, Iowa): Graduate of Alexian Brothers School of Nursing, Chicago; graduate of Norwegian American Hospital School of Anesthesia, Chicago; member of AANA in good standing since 1949; treasurer, Iowa Association, 1951-55; president, Iowa Association, 1957-59; secretary, Upper Mid-West Assembly, 1955-56; chairman, Upper Mid-West Assembly, 1956-57; member, AANA Approval of Schools Committee, 1956-59; member, AANA Board of Trustees, 1959-61.

VICE PRESIDENT

Sister M. Yvonne (St. Francis Hospital, La Crosse, Wis.): Graduate of St. Anthony School of Nursing, Carroll, Iowa; graduate of Viterbo College, La Crosse; graduate of St. Joseph Hospital School of Anesthesia, Milwaukee; member of AANA in good standing since 1936; director of school of anesthesia, La Crosse, 1942-61; president, Wisconsin Assocation of Nurse Anesthetists, 1955-57; member, AANA Planning Committee, 1954; member, AANA Board of Trustees, 1958-60.

TREASURER

Marie W. McLaughlin (Ingalls Memorial Hospital, Harvey, Ill.): Graduate of St. Luke's Hospital Nurse's Training School, St. Paul, Minn.; graduate of St. Luke's Hospital School of Anesthesia, St. Paul; member of AANA in good standing since 1933; secretary-treasurer, Tri-State Nurse Anesthetists Assembly, 1953-54; chairman of Convention Committee, AANA, 1953-54; member, AANA Bylaws Committee, 1954-55; treasurer, AANA, 1955-61.

TRUSTEES, REGION 1

Helen Heckathorn (St. Vincent's Charity Hospital, Cleveland, Ohio): Graduate of Cleveland City Hospital School of Nursing, Cleveland; graduate of University of Michigan Hospital School of Anesthesia, Ann Arbor; member of AANA in good standing since 1937; past-president, Ohio ANA; chairman, Revisions, Program and Nominating Committees of Ohio ANA; member, Scholarship Committee, Ohio ANA; member, AANA Credentials and Publications Committees; chairman, AANA Publications Committee, 1959.

Catherine McGarry (Brookline, Massachusetts): Graduate of Massachusetts General Hospital School of Nursing, Boston, Mass.; graduate of Johns Hopkins Hospital School of Anesthesia, Baltimore; member of AANA in good standing since 1947; formerly secretary-treasurer, vice-president and president of Massachusetts ANA; vice-chairman, New England Assembly, 1959; chairman, New England Assembly, 1961; member, AANA Convention Committee, 1959.

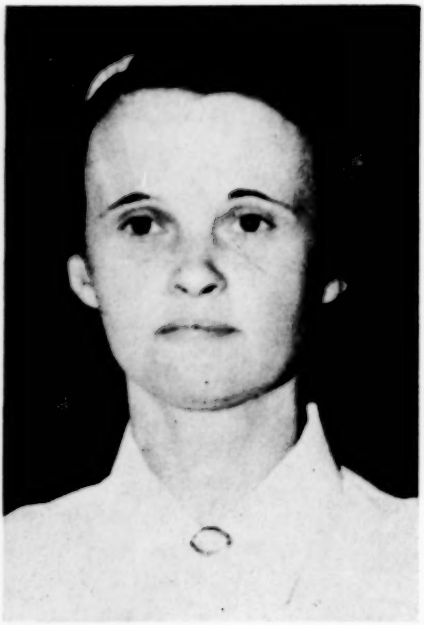
TRUSTEES, REGION 4

Florence E. Ballenger (Billings, Montana): Graduate of Pasadena Hospital School of Nursing, Pasadena, Calif.; graduate of Columbus Hospital School of Anesthesia, Great Falls, Mont.; member of AANA in good standing since 1944; secretary-treasurer, Montana Association of Nurse Anesthetists, 1958-61; vice-president, Montana Association of Nurse Anesthetists, 1954; member of Montana Association of Nurse Anesthetists Bylaws Committee, 1958.

Helen Vos (Barnes Hospital, St. Louis, Missouri): Graduate of Deaconess Hospital School of Nursing, Marshalltown, Iowa; graduate of University of Michigan Hospital School of Anesthesia, Ann Arbor; member of AANA in good standing since 1947; formerly Director of schools of anesthesia in Flint, Michigan and Lahore, West Pakistan; Educational Director, Barnes Hospital School of Anesthesia, St. Louis, 1959 to present; past chairman, AANA Institute and Educational Committees.

Mildred C. Rumpf (Santa Fe Hospital, Topeka, Kansas): Graduate of Concordia Hospital School of Nursing, Concordia, Kansas; graduate of Jackson Park Hospital School of Anesthesia, Chicago; member of AANA in good standing since 1949; past-president, Kansas Association of Nurse Anesthetists; president of the Kansas State Board of Nurse Registration and Nursing Education; and active in other nursing and civic groups.

TRUSTEES, REGION 5



Vera R. Scott (Lafayette, California): Graduate of Los Angeles County General Hospital School of Nursing; graduate of Columbus Hospital School of Anesthesia, Great Falls, Mont.; member of AANA in good standing since 1942; secretary, and immediate past president of California Association; program chairman, Western States Assembly, 1960 and of AANA Convention Committee, 1960.

L. Mae Wright (Tucson, Arizona): Graduate of Middle Georgia Hospital School of Nursing, Macon, Georgia; graduate of University Hospitals School of Anesthesia, Cleveland; member in good standing of AANA since 1948; chairman of Bylaws and Nominating committees; member of Board of Trustees; vice-president and past president of the Arizona Association of Nurse Anesthetists.

Classified Advertisements

WANTED — Lady Nurse Anesthetist — Group of 7 Physicians and 7 Nurses — Salary open — Contact Albuquerque Anesthesia Service, Medical Arts Square, N. E., Albuquerque, N. Mex.

SURGERY ANESTHETIST for 870 bed hospital. Salary open. Liberal employee benefits. Write John R. Mote, Assistant Director, Methodist Hospital, Indianapolis, Ind., for further information.

NURSE ANESTHETIST, Male or Female, for hospital on Staten Island, N. Y., excellent conditions. Write: Box B-44, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Ill.

NURSE ANESTHETIST — $500. New and Modern Surgery: unusually strong and well diversified Surgical Staff. Good opportunity in new 260-bed hospital; college town location; good personnel policies; 40-hour week; 7 holidays, hospitalization. Social Security. Apply: Carl Renz, Personnel Assistant, Chambersburg Hospital, Chambersburg, Pa.

NURSE ANESTHETIST — 500 bed hospital. Anesthesia Department consists of three M.D. and thirteen Nurse Anesthetists. Write to Medical Director, Crawford W. Long Hospital, Atlanta, Georgia.

NURSE ANESTHETISTS — For new 800 bed teaching hospital with modern operating room facilities; liberal personnel policies; group life, hospitalization, retirement benefits. Pleasant working conditions. Salary commensurate with training and experience. Residence accommodations available. Write to Personnel Director, Grady Memorial Hospital, 80 Butler St., S. E., Atlanta 3, Ga.

WANTED: C.R.N.A. for 160 bed Mid-western hospital. Excellent Personnel Policies and fringe benefits. Starting salary $475, with $25 merit raise in six months; additional pay for call. Reply to Box B-68, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Illinois.

NURSE ANESTHETIST—C.R.N.A. to work with Anesthesiologist in 100 bed hospital. College town. Liberal employment policies. Salary open. Contact L. E. Wells, M.D., Southside Community Hospital, Farmville, Va.

REGISTERED NURSE ANESTHETISTS: 690 bed hospital, primarily surgical. Integral part of developing 236 acre Detroit Medical Center. Emergency surgery only on Saturdays. Salary commensurate with qualifications. Excellent personnel policies. Write or call Personnel Director, Harper Hospital, Detroit 1, Michigan.

NURSE ANESTHETIST to complete staff of three serving 130 bed hospital, fully approved by JCAH. Excellent salary; liberal Personnel Policies. Modern furnished apartment. Additional information on request. Pulaski Hospital, Pulaski, Va.

POSITIONS OPEN for A.A.N.A. member to increase to staff of five. Large University Hospital, excellent staff with wide variety of Surgical cases, including Thoracic Surgery. Two weeks paid vacation, cumulative sick leave and six paid holidays. Other fringe benefits if desired. Starting salary with compensation for call duty averages $570.00-$600.00. Five day week. Contact Miss Ramona Kersey, Chief Nurse Anesthetist, Firmin Desloge Hospital, St. Louis 4, Mo.

WANTED — Nurse Anesthetist — 125 bed hospital, located in the Black Hills, good salary, extra pay for OB calls, good working conditions, 3 weeks vacation. Write Ruth L. Hanson, Anes. Dept., Bennett Clarkson Memorial Hospital, Rapid City, S. Dak., or call collect FI 3-0445.

NURSE ANESTHETIST — Salary $5,200-$6,400 per year. 40 hours weekly. One easy night call every two weeks. One easy weekend call every two months. Four weeks vacation annually. Member AANA required. Please state training and experience in first letter to Dr. John C. Snow, Massachusetts Eye & Ear Infirmary, Boston, Mass.

NURSE ANESTHETIST — Third RNA needed for 100 bed fully accredited General Hospital. Sick leave, paid vacation, excellent working conditions. Blue Cross, Blue Shield pd. by hospital. Salary starts at $600.00 per month. Apply Cogdell Memorial Hospital, Snyder, Texas.

NURSE ANESTHETIST for active Obstetrical Department. University affiliated. 250 bed teaching hospital. 200-225 deliveries per month. Rotation of day and night work, week ends and holidays. Coverage shared by three Anesthetists. Liberal benefits including sickness and accident insurance, retirement program. Inquire: Highland Hospital, Rochester, N. Y.

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2 FRENCH NURSE ANESTHETISTS, experienced, 1 member of AANA desire position in the same hospital. Preference: Southern United States. Reply: Miss Francine Chapelle, CRNA, Hopital de Mustapha, Algiers, Algeria.

NURSE ANESTHETIST — for 100 bed General Hospital, to complete staff of three. New, modern, air conditioned hospital located in Midwest University town. Salary open dependent on qualifications and experience. Write: Jack Edmundson, Administrator — Doctors Hospital — Carbondale, Ill.

WANTED: Nurse Anesthetist—completely new air conditioned 210 bed hospital. Normal staff 3 Nurse Anesthetists, some anesthetics given by Anesthesiologist in private practice. Starting salary $550.00 per month, gross, 40 hour week plus calls. Write or call: L. P. Goudy, Administrator, Proctor Community Hospital, Peoria, Ill., Ph. 688-6621.

NURSE ANESTHETIST — Male or Female to complete staff of three serving 100 bed hospital. Salary commensurate with experience. Contact Administrator, St. Joseph's Hospital, Dickinson, N. Dak.

ANESTHETIST: Opening for 2nd Anesthetist in General Hospital of 62 beds. Desirable position for one wishing light work schedule. Salary open. Usual fringe benefits. Carmi Township Hospital, Carmi, Ill.

WANTED: REGISTERED NURSE ANESTHETIST. East Tennessee Area. Starting salary, $600.00 per month for a 40 hour week. Opportunity for additional call-time-income. Well supervised department, 400 bed hospital. Box B-71, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Illinois.

REGISTERED NURSE ANESTHETIST to complete staff of four in 125 bed approved hospital. Salary open. Contact John R. Gadd, Administrator, Lee Memorial Hospital, Fort Myers, Fla., the "City of Palms."

OPENING for two Nurse Anesthetists, who have preferably just completed training, to fill positions created by expansion program including the addition of a new building and enlarged operating suite. Leading community hospital in the leading University City of the Northeast. Forty hour week plus call. Beginning salary minimum $480 plus remuneration for call. Liberal vacation and sick leave. Apply James H. Buskirk, Director, Department of Anesthesiology, Mount Auburn Hospital, Cambridge, Mass.

NURSE ANESTHETIST: Immediate opening in 85 bed hospital. Salary open with laundry of uniforms included. Three weeks vacation after first year, 4 weeks each year thereafter. Sick leave, holidays, pension retirement plan, Blue Cross - Blue Shield, Social Security, group insurance available. Contact Hospital Director, Memorial of Bedford County, Bedford, Pa.

ANESTHETIST: Nurse to cover Obstetrical Anesthesia in new and modern Obstetrical Department and to substitute in O. R. of fully accredited 175 bed New York State Hospital. 5 days, 40 hours, 8 holidays and three weeks vacation. $6,000 per annum to qualified candidate. A wonderful opportunity to join the staff of a truly progressive hospital. Write to the Personnel Director, Benedictine Hospital, Kingston, New York.

MAINE MEDICAL CENTER. Excellent opportunity for Certified Nurse Anesthetist who enjoys coastal and inland recreation. Two hour drive from Boston. Congenial staff of four physicians, six Surgical Nurse Anesthetists, two night Obstetrical Anesthetists. For details write: John R. Lincoln, M.D., Director of Anesthesia, Maine Medical Center, Portland, Maine.

REGISTERED NURSE ANESTHETIST—to complete staff of seven for 316 bed General Hospital located in Cleveland's near West Side. Good transportation to downtown area. Four weeks paid vacation; call duty every 5 to 6 nights; salary governed by experience and qualifications. Apply: Marcia E. Williams, CRNA, Dept. Anesthesia, St. John's Hospital, Cleveland 2, Ohio.

NURSE ANESTHETIST, Male or Female, salary commensurate with qualifications. Average on duty week of 20 hours, 3 weeks vacation, sick leave accumulative to 3 weeks, 6 holidays. 120 bed hospital with small OB call and 2 other Anesthetists. Sunbury Community Hospital, Sunbury, Pa.

STAFF ANESTHETISTS for General Hospital—140 beds. Good beginning salary and employee benefits. Positions available September 1, 1961. Write for details: St. Anthony Hospital, 1004 N. 10th St., Milwaukee 3, Wis., c/o Personnel Director.

IMMEDIATE OPENING FOR NURSE ANESTHETIST: 6-bed hospital needs two Nurse Anesthetists to complete Surgery Staff, near college town, paid vacation, sick leave, and other liberal fringe benefits. Salary open. Reply to Administrator, Terry County Hospital, P. O. Box 112, Brownfield, Texas.

FEMALE. Registered Nurse Anesthetists to work day shift 40 hour week, in approved school for Nurse Anesthetists in a 400 bed General Hospital 8 miles South of Boston. Write or Contact Anesthesia Dept., Quincy City Hospital, 114 Whitwell St., Quincy 69, Mass., PR 3-6100, Ext. 244.

NURSE ANESTHETIST: 364 bed General Hospital being enlarged to 500 beds. Want to enlarge present staff of 2 M.D.'s plus 8 Anesthetists. Salary to $500 per month plus extra bonus payment per case on call duty and retirement and sickness benefits. New air conditioned Operating Rooms. Apply: Chief, Department of Anesthesia, York Hospital, York, Pa.

REGISTERED NURSE ANESTHETIST — for Obstetrical Department — nights. Good opportunity in new, air conditioned, 259 bed expanding hospital. Apply: Personnel Director, William Beaumont Hospital, Royal Oak, Michigan.

WANTED: Nurse Anesthetists to increase present staff under direction of Anesthesiologist; in State Capitol and University City. Starting salary $5,940.00 with liberal benefits. Both automatic and merit raises provided. Write: Chief Nurse Anesthetist, Rex Hospital, Raleigh, North Carolina.

NURSE ANESTHETIST, Male or Female. Sixty bed hospital, Northeastern Wisconsin. Fully accredited. Salary open. Limited amount of call. Write or call collect—Administrator, Shawano Community Hospital, Shawano, Wis.

FEMALE OR MALE ANESTHETIST, CRNA. Member with experience in Endotracheal Intubations. Needed now in 50 bed Private Hospital, good equipment, located in friendly middle Georgia City, liberal Personnel Policy. Apply Dr. C. P. Savage, Riverside Sanatorium, Montezuma, Ga.

NURSE ANESTHETIST needed immediately. Experience preferred, but will accept new graduate. Salary open. Contact: St. Joseph Mercy Hospital, 421 N. Lake St., Aurora, Ill. Attn: Personnel Director.

ANESTHETIST—Nurse: to complete staff of three for modern 100 bed hospital;Winter ski and Summer boating area in beautiful Southern Vermont; starts $5,500 to $6,000 dependent on qualifications; 4 weeks vacation, sick time, Blue Cross, etc. Apply Ronald H. Neal, M.D., Chief, Department of Anesthesiology, SPRINGFIELD HOSPITAL, Springfield, Vt.

REGISTERED NURSE ANESTHETIST: Immediate opening. To join present staff of 10 Nurse Anesthetists and 4 M.D.'s. Modern, air conditioned 259 bed hospital in Northern suburb of Detroit. Apply: Personnel Director, William Beaumont Hospital, Royal Oak, Mich.

NURSE ANESTHETIST—AANA Member for Veterans Administration Hospital in Cleveland, Ohio. Starting salary commensurate with experience. Forty hour week, thirty days vacation, fifteen days sick leave, eight holidays annually. Active and varied Surgical Service. Staff includes one Anesthesiologist, five Nurse Anesthetists. Please contact Dr. F. A. Smith, V. A. Hospital, 7300 York Rd., Cleveland 30, Ohio.

NURSE ANESTHETIST: Immediate opening. New 135 bed hospital completely air conditioned, Miami, Florida. $450.00 per month, plus bonus for cases on call. Fringe benefits, Surgical and Obstetrical Anesthesia. Reply with pertinent information and references. South Miami Hospital, South Dixie Highway at 62nd Ave., South Miami, Florida.

WANTED: By man C.R.N.A., position in middle west or western states; to work on free-lance basis. Reply: Box M-81, Journal American Association of Nurse Anesthetists, 3010 Prudential Plaza, Chicago 1, Illinois.

WANTED: Nurse Anesthetist for 140 bed General Hospital, fifty miles Northwest of Pittsburgh. Four Nurses, full time Anesthesiologist. Salary open; automatic increases; four weeks paid vacation. Write James Bruce, M.D., Anesthesia Dept., New Castle Hospital, New Castle, Pa.

WANTED: Nurse Anesthetist for attractive, permanent position in 150 bed hospital. All types of Surgery. Work under Anesthesiologist. Excellent working conditions and salary. Contact Administrator, Pottstown Hospital, Pottstown, Pa.

CRNA—MALE—Married with Family—Physician trained—four years experience in all types of General Anesthetics—interested in relocating—desires position near Metropolitan area—will accept responsibility and require adequate compensation. Reply: Box B-72, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Ill.

NURSE ANESTHETIST, Male or Female. Immediate opening. Modern, well equipped, 44 bed General Hospital. Progressive community of 6000 in S. E. Wyoming on North Platte River. Good hunting and fishing. Compensation open. Contact Supt., Goshen County Memorial Hospital, Torrington, Wyo.

NURSE ANESTHETIST FOR OB ANESTHESIA — Well qualified and experienced to work in 200 bed hospital located in Southern California. Contact: Administrator, Santa Ana Community Hospital, 600 E. Washington Ave., Santa Ana, Calif.

NURSE ANESTHETIST: Immediate opening. Staff Anesthetist; 180 bed hospital; well defined Personnel Policies; good benefits. Salary $650-$700. Community of 20,000; College Town, located on beautiful Lake Superior. Fine recreational activities Winter and Summer. Apply—H. B. Lehwald, Administrator, St. Luke's Hospital, Marquette, Mich.

NURSE ANESTHETIST: 550 bed hospital. Anesthesia Department consists of one M.D. and twelve Nurses. Positions open for two additional Anesthetists. Write to Director of Anesthesia, Harrisburg Polyclinic Hospital, Harrisburg, Pa.

WANTED—Trained Nurse Anesthetists to work with a qualified M.D. Anesthesiologist in a New England coastal community hospital. State qualifications and present salary. Apply: Administrator, Portsmouth Hospital, Portsmouth, N. H.

REGISTERED NURSE ANESTHETIST: Wanted for 40 bed hospital. Modern equipment, very congenial and considerate staff. Work not heavy, Obstetrical call rare. Starting salary $600 plus overtime for call. St. Helens is situated on the Columbia River, 30 miles from Portland, near beach and mountains. Write Administrator—Mrs. Mary Angelo, Columbia County District Hospital, St. Helens, Ore. Phone 1188.

WANTED: 2nd Nurse Anesthetist, Male or Female, position available immediately, 56 bed General Hospital. Interested persons contact Mrs. Patsy Holden, Administrator, Gainesville Sanitarium, Gainesville, Texas.

NURSE ANESTHETIST: 50 bed hospital, accredited. New surgery wing being completed. Salary open. Split call and Surgery Schedule. Auburn is a suburban city of 15,000 between Seattle and Tacoma in the beautiful Pacific Northwest. Good fringe benefits: paid Blue Cross, vacation, sick leave, 7 holidays. Contact Wm. A. Erickson, Administrator, Auburn General, Auburn, Wash.

WANTED—Nurse Anesthetist, Male or Female, 150 bed modern hospital located in Columbia, Tennessee. Base salary $500 per month, $10 per case for each case started after 3:00 p.m. Monday through Friday and for all emergency cases other than during regular schedule. Minimum monthly guarantee of $580. For further information on employment policies, contact William B. Barnhart, Administrator, Maury County Hospital, Columbia, Tennessee.

WANTED: Nurse Anesthetist for 156 bed hospital in town of 6,000 in lower South Carolina 50 miles from Charleston. Attractive living conditions, working hours, fringe benefit. Salary open. Please contact by letter or wire, T. B. Stevenson, Superintendent of Colleton County Hospital, Walterboro, S. C.

NURSE ANESTHETIST: Immediate opening in 102 bed hospital. Salary open with laundry of uniforms included. Three weeks vacation after first year, four weeks vacation each year thereafter. Sick leave and holidays. No OB call. Operating suite 6 years old. For further information please contact: G. W. Berndt, Director of Anesthesia, Dodge County Community Hospital, Fremont, Nebr.

URGENT — Third Female CRNA needed to free lance in 100 bed accredited hospital. Additional information on request. Contact: Chief Anesthetist, Ephraim McDowell Memorial Hospital, Danville, Ky.

TWO NURSE ANESTHETISTS: Wanted for General Hospital to complete staff of seven. Forty hour week, no OB call except emergencies. On weekend call every six weeks. Three week vacation. Write to: Mr. Robert Sherrod, Nashville General Hospital, Nashville, Tenn., or call AL 5-6311.

WANTED: Nurse Anesthetist by August 1. Contact: Lawrence C. Walker, Administrator, Davis Hospital, Statesville, North Carolina.

W-A N T E D : NURSE ANESTHETIST. 112 bed General Hospital fully accredited. Employ three Anesthetists to cover surgery and obstetrics. Salary $500 per month to start, and raise to $535 in six months. Apply: Administrator, Radford Community Hospital, Radford, Virginia.

NURSE ANESTHETISTS—Immediate openings for qualified registered nurses in 450 bed short term general hospital with active surgical program. Opportunity to associate with three board certified anesthesiologists. Salary commensurate with experience and training. Write, furnishing outline of experience, to Director of Anesthesia, Delaware Hospital, 501 W. 14th Street, Wilmington 99, Delaware.

W A N T E D IMMEDIATELY: C.R.N.A. for 170 bed General Hospital in college city of 130,000. Salary $525.00 per month, plus free meals when on duty. Share call with three other anesthetists. Day off after call. Contact: Mr. Milton F. Campbell, Chief Anesthetist, Lincoln General Hospital, 2315 South 17th Street, Lincoln 2, Nebraska.

WANTED: Nurse Anesthetist for 175 bed hospital. College town and resort area. Modern, air conditioned surgery. Salary depending upon qualifications and experience. Contact Dr. Kenneth J. Shouldice, Administrator, War Memorial Hospital, Sault Ste. Marie, Michigan.

NURSE ANESTHETIST: Salaries from $5,885 to $7,425, depending upon experience. Positions under Civil Service Merit System. 40 hour basic work week; liberal vacation and sick leave plan; health, life insurance and retirement plans. Excellent opportunities for advanced training and experience in large general hospital with active teaching and research programs. Apply, Personnel Officer, D. C. General Hospital, Washington 3, D. C.

Cornejo

(Continued from page 210)

needs of the additional stress of the gastrointestinal hemorrhage. This is essential since the hemorrhage and shock will be fatal if the adrenal support is withdrawn.

REFERENCES

[1] Gillies, A. J.: Cortisone Therapy Prior to Surgical Intervention: Incidence and Effect on Adrenal Cortical Function. Anesth. & Analg. *37*:47-50, March-April 1958.

[2] Vandam, L. D.: Outlines and Summaries of Lectures Presented, Oct. 1959.

[3] Vandam, L. D. and Moore, F. D.: Adrenocortical Mechanisms Related to Anesthesia. *21*:531-552, Sept.-Oct. 1960.

[4] Bayliss, R. I. S.: Surgical Collapse During and After Corticosteroid Therapy. Brit. Med. J. *2*:935-936, Oct. 18, 1958.

[5] Wylie, W. D. and Churchill-Davidson, H. C.: A Practice of Anaesthesia. Year Book Publishers, Chicago, Ill. 1961.

[6] Tarrow, A. B.: Basic Sciences in Anesthesiology: A Guide for Study. Lydette Publishing Co., San Antonio, Texas 1959.

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(Continued from page 221)

made. It may be that at a trial such express warranties will be unprovable, but that is not a reason for granting the motion to dismiss at this time.

Defendants' motion is, therefore, denied in its entirety.

(Napoli v. St. Peter's Hospital, Sup. Ct., Kings Co., Sp.I. DiGiovanna, J., N.Y.L.J., March 14, 1961, p. 15, col. 3-4.)

Atlantic City

September 24-28, 1961

Beginning on page 183 you will find the program for the annual meeting.

Once again the convention committee has come up with an outstanding group of speakers. These alone should be sufficient reason for your attendance at the meeting.

Equally important to members of A.A.N.A. will be the business meeting to be held on Tuesday, September 26. Active members who attend that meeting will vote on the proposed changes in the bylaws. This is your opportunity to help determine the future status of the dues, the persons who will serve as your officers and trustees, and have a voice in establishing association policies.

During the busy week you will have an opportunity to meet with your friends at two banquets. In addition to the food, each of the two events, Monday and Wednesday evenings, will be highlighted by nationally known entertainers.

The states in voting Region 2 will be hosts for this meeting.

Will meet you on the boardwalk.

ATLANTIC CITY CONVENTIONEERS

To save yourself waiting time in the ticket line in the AANA booth in Atlantic City, order your banquet tickets now. This advance sale of tickets will be discontinued on September 1. Money received after that date will be refunded by mail.

Name_____

Address_____

City_____ State_____

_____ Monday Night banquet tickets @ $6.00

_____ Wednesday Night banquet tickets @ $6.00

Check enclosed $_____

Call to the Convention

As provided for in the Bylaws of this Association, and at the direction of Evelyn E. Auld, President, we hereby issue this official call to the members for the annual meeting to be held in Atlantic City, September 24-28, 1961. The annual business session will be held on Tuesday, September 26, in the Convention Hall.

Accomplished at the Executive Offices, Prudential Plaza, Chicago 1, Illinois, this first day of July, 1961.

Florence A. McQuillen

Executive Director

The THIRTY-FOURTH QUALIFYING EXAMINATION for membership in the American Association of Nurse Anesthetists will be conducted on November 18, 1961. The deadline for accepting completed applications including the transcripts is October 9, Notice of eligibility will be mailed about October 16.

Applications should be forwarded early enough to allow time to request transcripts and have them returned to the Executive Office before the deadline date.

A Continuing Education Program for Nurse Anesthetists will be conducted by the Catholic Hospital Association in St. Louis, Missouri — the week of September 18-22, 1961.

For further details contact Mr. John T. James, Director of Continuing Education, Catholic Hospital Association, 1438 South Grand Boulevard, St. Louis 4, Missouri.

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The Journal OF THE American Association of Nurse Anesthetists

Contributions to the Journal should be typewritten, double spaced, on one side of white typewriter paper. The title of the article and the author's name and title should appear at the top of the first page. Hospital or university affiliation, and the place and time when the paper was presented to a group should be included in a footnote on the first page.

Articles for publication in the Journal of the American Association of Nurse Anesthetists are accepted with the understanding that they have not been published or accepted for publication in other journals.

Illustrations should be glossy prints. Each illustration should carry a number and the author's name. Legends for illustrations should be typed on a separate page at the end of the manuscript. Tables should be prepared each on a separate sheet with the number and legend on the same sheet. Tables should not exceed one page under ordinary circumstances. The type size of the Journal page is 4 1/2 x 6 7/8 inches. Illustrations should be adaptable to this size or one column width, 2 1/8 inches.

References should be complete giving the full name of the author or authors, full title of the article, full title of the journal or book, volume number, page, month, date (when it applies) and year. The standard form of reference is included for the convenience of contributors.

Berger, Olive L.: The Use of Respirators in the Immediate Postoperative Period. J. Am. A. Nurse Anesthetists. 27:182, Aug. 1959.

Adriani, John: The Chemistry of Anesthesia. Springfield, Ill. Charles C Thomas, 1952.

Proofs will be sent to the author prior to publication.

Manuscripts should be submitted to the Editor of the Journal of the American Association of Nurse Anesthetists, Suite 3010, 130 E. Randolph St., Chicago 1, Illinois.